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PLANTS & GARDENS

SPRING
1953

Gardeners'
Handbook

General Guidance

on

Planting Plans

Lawns

House Plants

Annuals

Perennials

Trees and Shrubs

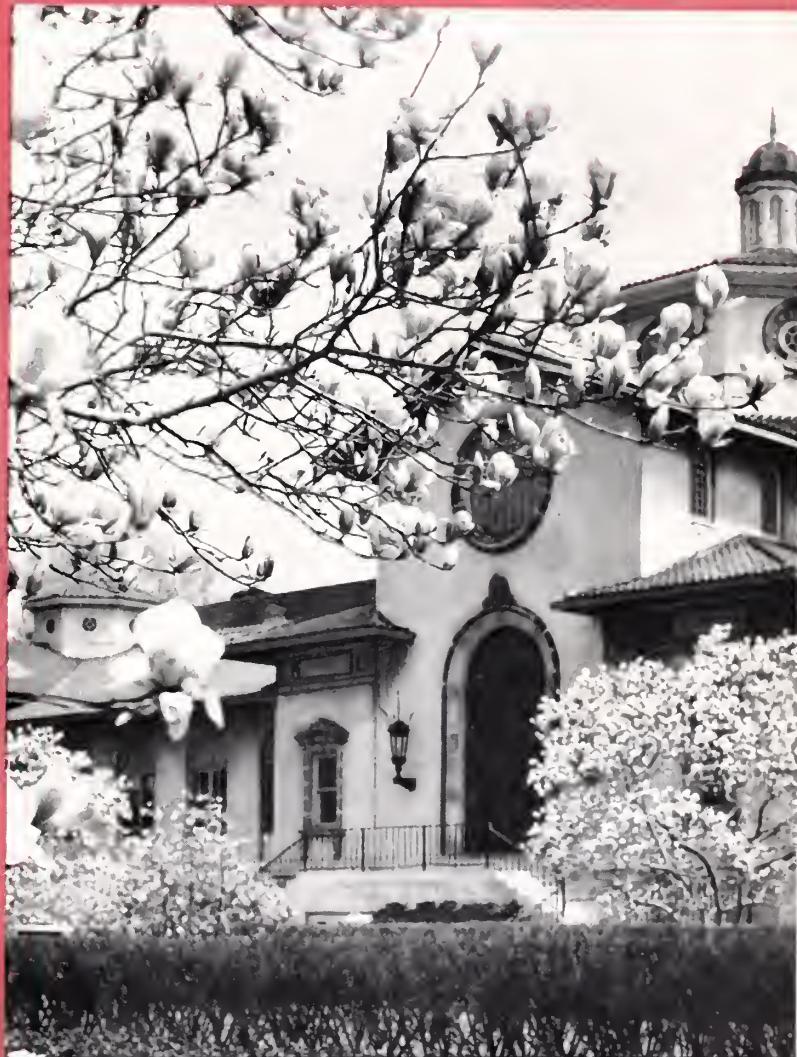
Vegetables

Compost

NEW SERIES

9

NO. 1



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PLANTS & GARDENS

Adams-needle (*Yucca filamentosa*)

VOL. 9

Spring, 1953

No. 1

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Editorial

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Except where otherwise indicated, drawings by PETER K. NELSON

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Flowering Trees and a Naturalized Planting of Daffodils at the
Brooklyn Botanic Garden

Except where otherwise credited, photographs by Louis Buhle.

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SPRING 1953

Many of the problems that face experienced amateur gardeners and horticulturists have been answered in previous issues. This number, our Editorial Committee felt, should be slanted toward those who are not so far along.

It seemed appropriate for us to seek the cooperation of Guest Editor Alfred C. Hottes and the able authors he has chosen. Their collective experience and service in giving garden and horticultural counsel has been a boon to amateur growers everywhere — as well as to our Committee!

Questions by the thousand:

In the course of a year Botanic Garden staff members spend a total of some 800 hours answering 10,000 questions by telephone alone. This is the same as having one person in continuous telephone conversation for 5 months of 40-hour weeks. As a public service, it is part of the job our people enjoy doing. And here are some of the queries they receive, by letter as well as by phone:

"How do we plant trees and shrubs on our newly acquired property, and how do we go about making a lawn ... and flower beds?"

"Which are the best annuals and perennials for summer bloom?"

"How do I start a compost pile?"

"How often must I water my house plants ... and how does one get rid of mealy bugs?"

About 20 questions are asked over and over again by different people; these are the basis of this handbook on gardening.

Whether you are an experienced gardener or an enthusiastic beginner, start this issue with its first article — Foresight in Planting.

Yours sincerely,

George S. Avery Jr.

Director



McFarlan

A good foundation planting should be kept simple, with only two or three kinds of low-growing plants.

FORESIGHT IN PLANTING

*How to plan for a peaceful, distinctive garden
with interesting pictures and vistas—without too much work*

Alfred C. Hottes

EVERYONE desires to live in a gardened home of which he can be proud. The most modest house and even the house of poor architecture can be completely transformed by a simple planting. How can the planting be properly started?

The best way for a beginner is to hire a competent landscape architect who has devoted his life to the study of plants and knows just how tall each one grows, how coarse or fine its texture, and how adaptable it is to soils, wind, and moisture. Competent nurserymen also know most of these facts and are willing to advise.

If the homeowner is to do all the planning and work himself, he must make

frequent trips of observation. He must study the grouping of shrubs and trees in parks and botanic gardens, along the streets, and in the yards of his friends. If he makes notes on the plantings that please him, he is more likely to buy wisely. He will be making a picture, using plants instead of paint.

The poorest way of landscaping the home grounds is to look through a nursery catalog without a plan in mind and then blindly choose plants without knowing how many the place will accommodate.

The usual home gardener becomes a hopeless inept when he visits a nursery or scans a catalog. It is a common practice for persons to plant everything the neighbors will give them; and some



McFarland

A poor foundation planting, with too many kinds of plants—several of them already too tall to be close to the house. Low junipers in the foreground should have been planted a little farther from the walk and should have a little informal pruning.

believe that as long as there is a square foot of soil not covered by some form of vegetation there is still room for a giant forest tree.

It is only the extremely abstemious home buyer who can resist planting an apple, a pear, a plum, a peach, and a grape vine in his back yard, for they all look so innocent when young. If they all grow, the result is usually a hopeless hodgepodge of insect-ridden plants, for it would take a very experienced gardener to spray them all properly and keep them in healthy condition. Planting too many fruit trees eliminates the possibility of having any choice flowering annuals, perennials, or shrubs; and the planting becomes so unsatisfactory that the gardener soon loses his interest in gardening. He would be overworked if he took proper care of all his fruits, and dissatisfied with the disorder if he neglected them.

A weed is a plant out of place. Any

plant put into the ground and not placed properly is a weed, even though it is a fifty-dollar magnolia tree put into the usual dollar hole. Most people bring home new plants after every foray upon their friends' gardens; then they begin to wonder where to put this loot.

This article cannot go into details about the planting of the home grounds but it can outline a few general suggestions.

Keep the Planting Simple

If the garden needs six plants of one kind, do not buy thirty others for which there is no place. Staggered figures could be compiled on the money wasted in unwise planting every year.

Make a Plan Before Planting

Have an idea in mind. Do not dash around the yard planting hit and miss as if the shrubs and trees were dropped from an airplane. Keep the new trees and

shrubs in a wheelbarrow until the place for each one is evident, to complete a carefully thought-out picture. The plants are much easier to move in the wheelbarrow than when they are well rooted in the ground.

Make One Picture at a Time

Do first things first. Set off the doorways with appropriate plantings. Hide unsightly views. Enhance beautiful vistas.

Remember that Plants Grow

Everyone expects and wants plants to grow, yet few persons visualize the final effect. The average person shops for bargains, purchasing young trees to plant in front of the house; and when these grow rapidly into forest-size trees, the buyer is disappointed and complains to the nurseryman that his place has become a hopeless jungle. Some persons consider it a bargain to buy an inexpensive vine and plant it where it will hide good architecture.

Plan for Both Enclosure and Spaciousness

Plant the lot so that the garden is part of the house, with rooms, windows, and space. Begin the planting at the margins of the property, to achieve enclosure for peace and quiet; but do this adroitly so that there is no feeling of being smothered by the walls. If the lot has no view, make one. From the principal windows or doors make a path leading to a garden feature—a fountain, a pool, a seat, a well branched picturesque tree.

Strive for Pleasing Forms and Lines

Flat surfaces give a feeling of peace but they may become monotonous; undulating lines give rhythm to the landscape.

The perfect globe form to which some shrubs are pruned is a disturbing element in the landscape. A pyramid is the most exalting form; but a series of pyramids reminds one of a coarse-toothed saw. It is like the forbidding wall with bits of broken bottles stuck into the concrete; yet many persons are insensitive to this and

plant the foundations of their homes with a serried row of pyramidal conifers. It is true, however, that attractive groupings of three or five clustered pyramid can be made to give the effect of one.

Make the Planting Interesting

How to achieve an interesting garden is in each person's hands as an artist or an innovator. A surprise of some sort makes a planting more interesting; but do not litter the yard with rows of strange rocks, toy ducks, and windmills. The garden should be peaceful and should not be filled with objects that do not belong there.

Plan So as to Avoid Too Much Work

Attempting too much always bring disappointment. It is better to have a patio planned with charm than a thousand-acre estate that is a wilderness of weedy beds and disheveled lawns.

Shrubs and trees take the minimum of care—water, feeding several times a year, an all-purpose spraying less than once a month, and a little snipping now and then.

Annuals are much more work; they need to be sown from seed; they are inclined to be crowded by weeds, and soon they must be replanted to avoid a yawning gap in the landscape.

Make the Planting Distinctive

Gardens cannot be all alike, for some people like lilacs while others prefer azaleas. One likes formality and precision, another likes the winsome ways of Nature. Someone is provoked if he hasn't masses of color at all seasons of the year; he is, therefore, delighted with zinnias, while someone else is happy only if he is trying to grow a rare species of rock plant. No, gardens will never be sold by the gross. People are not alike.

Study the Plants

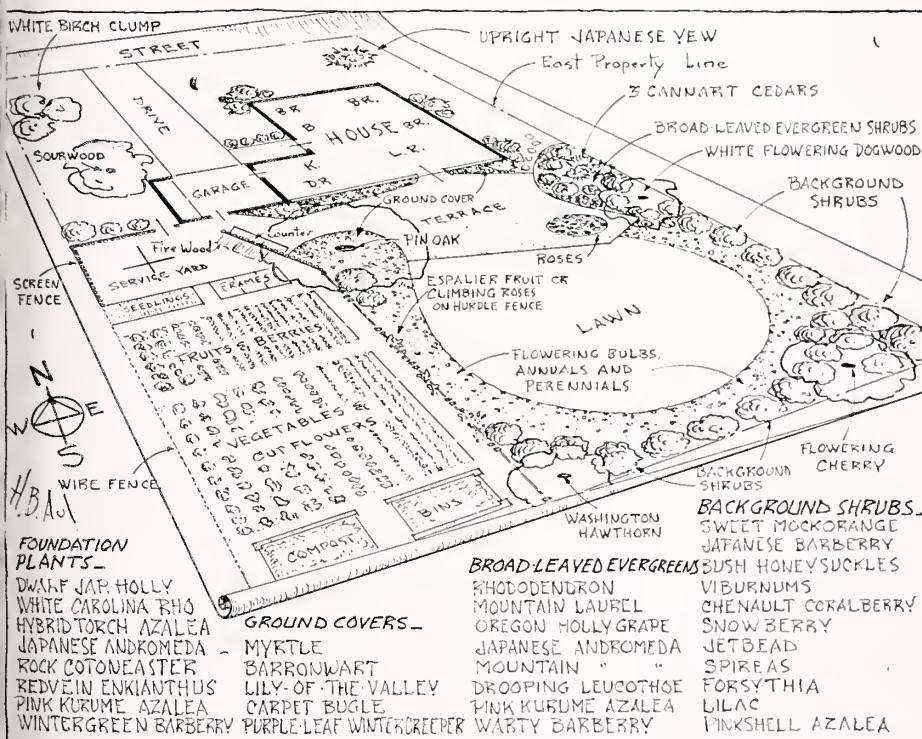
One who wishes to do good planting must know the plants and their habits. An interest in plants is an abiding one. Don't lose heart at the number of trees and shrubs in the nurseries.

Don't ask the name of an uncommon plant from a nurseryman or a fellow gardener without a pencil and a piece of paper larger than a matchbook cover on which to write it. Some plants are not common enough to have common names. It's fun to learn to spell and pronounce the scientific names—for one who thinks

so; and anyone who does not think so will not get the maximum enjoyment from his garden.

Poems are written with words; the words of a garden are its plants. A garden may be a poem, or it may be gibberish, or even raucous sounds. Make yours a poem!

Hire a landscape architect to plan the planting.
OR make careful observation of other plantings—
BUT don't copy them exactly.
Do not buy plants without a plan in mind.
Plan where each plant is to be placed.
Do not buy—or accept as gifts—
Too many different kinds of plants.
Plants that will grow **too large** for the space.

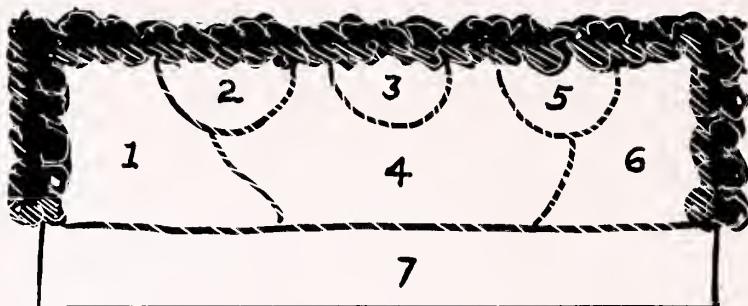


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A well planned layout.

PLANS FOR SIMPLE ANNUAL BEDS AND BORDERS

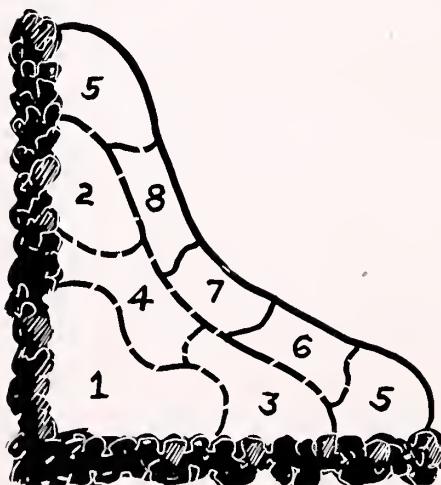
Suggestions for suitable combinations
for different effects and in various situations

Alfred C. Hottes



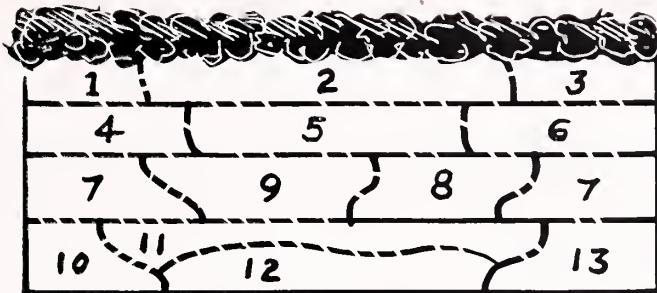
Pale Yellow Border

- | | |
|--------------------------|---|
| 1. stock, canary-yellow | 2. marigold (<i>Tagetes</i>) EARLY SUNSHIN |
| 3. cosmos BURPEE YELLOW | 4. turfing-daisy (<i>Matricaria</i>
<i>tchihatchewii</i>) LEMON BALL |
| 5. zinnia, canary-yellow | 6. petunia MOONBEAM |
| 7. phlox ISABELLINEA | |



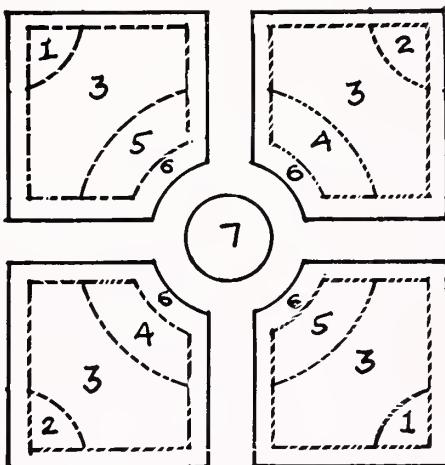
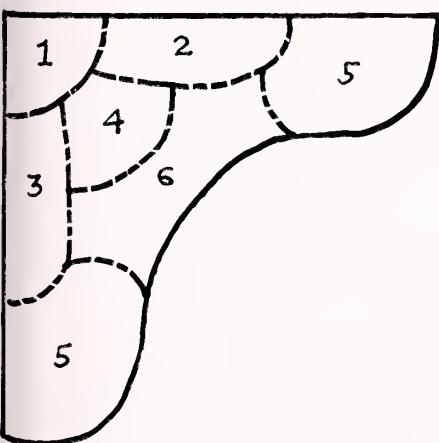
← A Fragrant Corner

- | | |
|---|--|
| 1. flowering tobacco (<i>Nicotiana</i>) | |
| 2. stock (<i>Matthiola incana annua</i>) pink | |
| 3. stock, orchid | |
| 4. sweet sultan (<i>Centaurea moschata</i>) purple | |
| 5. petunia, purple | |
| 6. sweet-alyssum (<i>Lobularia maritima</i>) VIOLET QUEEN | |
| 7. mignonette (<i>Reseda odorata</i>), green | |
| 8. pansy (<i>Viola tricolor hortensis</i>) | |



Medley of Blue-purple and Gold

1. mealycup sage (*Salvia farinacea*)
BLUE BEDDER
2. African marigold (*Tagetes erecta*),
some tall gold variety
3. cucumber-leaf sunflower (*Helianthus debilis*), soft yellow
4. larkspur (*Delphinium*), blue
5. zinnia, purple
6. zinnia, golden-orange
7. snapdragon (*Antirrhinum*), yellow
8. petunia HOWARD'S STAR, yellow
9. China-aster (*Callistephus*), purple
10. striped marigold (*Tagetes tenuifolia pumila*), yellow
11. tall ageratum, blue
12. sanvitalia, yellow
13. dwarf cornflower (*Centaurea cyanus nana-compacta*), blue



Tall Plants, Soft Yellow and Pink

1. sunset hibiscus, or golden-bowl hibiscus (*Hibiscus manihot*), yellow
2. annual hollyhock (*Althaea rosea*), pink
3. scabiosa, pink
4. flowering tobacco (*Nicotiana*), pink
5. cosmos, pink
6. tall zinnia, light yellow

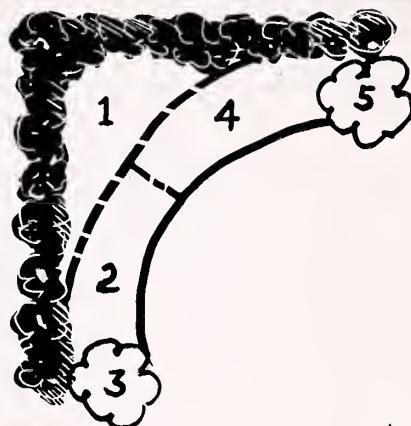
A Garden in White

1. white snapdragon (*Antirrhinum*)
2. petunia SNOWSTORM
3. white scabiosa
4. zinnia PURITY
5. white larkspur (*Delphinium*)
6. sweet-alyssum (*Lobularia maritima*)
CARPET OF SNOW
7. flowering tobacco (*Nicotiana*)



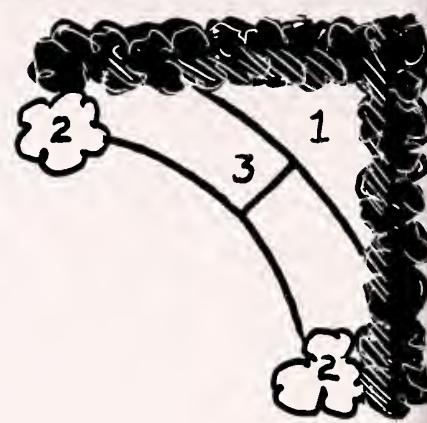
A vigorous
clump of
striped
marigold.

Burpee courtesy



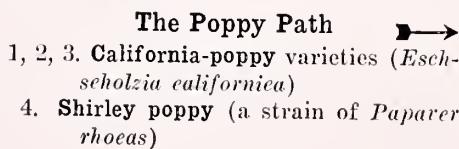
A Hot, Dry Corner

1. mealycup sage (*Salvia farinacea*)
BLUE BEDDER
2. striped marigold (*Tagetes tenuifolia pumila*)
3. Josephs-coat (*Amaranthus tricolor*)
4. California-poppy (*Eschscholzia californica*)
5. Princes-feather (*Amaranthus hybridus*)



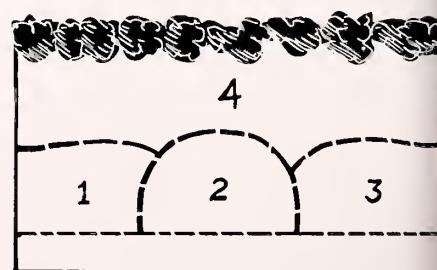
A Cool Corner

1. spider-flower (*Cleome*), white
2. calendula, pale yellow
3. ageratum, blue



The Poppy Path

- 1, 2, 3. California-poppy varieties (*Eschscholzia californica*)
4. Shirley poppy (a strain of *Papaver rhoeas*)





Burpee courtesy

A single bushy plant of dwarf double French marigold SPRY (page 12).

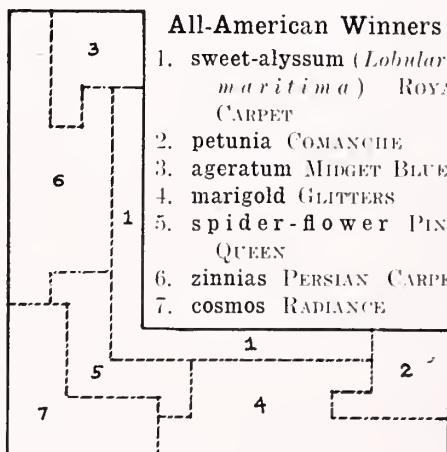
THE ALL-AMERICAN ANNUALS

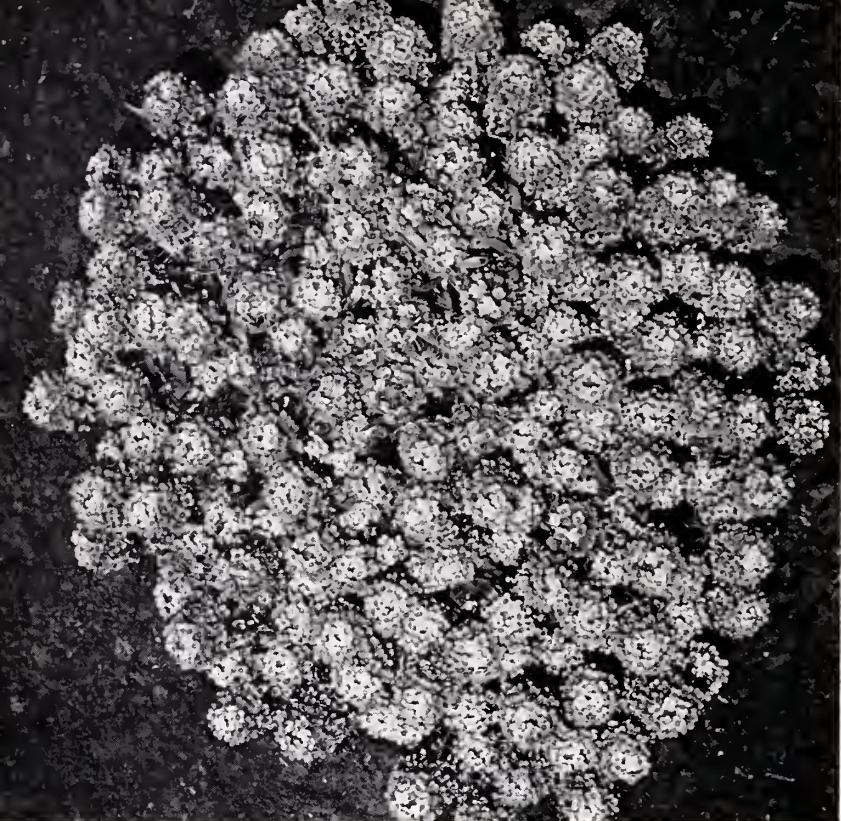
*A selected list of winners, new and old,
which are the present leaders in their groups*

W. Ray Hastings

GOOD gardening—getting the most for our interests and efforts—requires us to revise our variety list almost every year. We must add the new winners, perhaps replacing the old favorites, but hold on to the more outstanding sorts of previous years. Some remain best for their kinds, colors, and purposes for a number of years.

It is just twenty years ago that the seed industry instituted cooperative trials of flowers and vegetables. During these years the new productions of plant breeders have been grown, compared, and judged by experts throughout the whole United States. The winners have come to be known as All-America Selections.





Sweet-alyssum
ROYAL CARPET.

Author courtesy

Edging Annuals

Sweet-alyssum ROYAL CARPET, new in 1953, in violet or royal purple, 2 inches tall, leads the list of edging plants, suitable also for rock and wall gardens. It is a counterpart of CARPET OF SNOW, the dwarf white variety, and equally valuable.

Ageratum MIDGET BLUE, 1940 winner, 4 inches high, is a rich light blue, quite uniform from seeds.

Calliopsis (*Coreopsis*) GOLDEN CROWN grows but a foot tall; the flowers are golden yellow with a maroon center.

Pansies (*Viola tricolor hortensis*) reach back to the Dwarf Swiss Giants in mixed colors; and CORONATION GOLD, still leading the golden yellow varieties.

Linaria FAIRY BOUQUET, blooming and growing quickly, but for a short season, still leads the sprightly fairy group of miniature "snapdragons" for rockery and for surprise spotting. Their bright colors are refreshing.

Marigold (*Tagetes*) YELLOW PYGMY,

not over 6 inches tall, makes uniform edging or is good as a rockery subject of buttery yellow if we can wait until at least midsummer for covering the little plant with bloom. BUTTERBALL is its orange mate.

Somewhat taller, to 12 inches, and useful for bedding, for accent plants in rockeries, and for taller edging, are MELODY and SPRY among the dwarf double mahogany and gold marigolds, FLASH as the leading multicolored single, and NAUGHTY MARIETTA as the outstanding bicolor single marigold.

Verbenas, large-flowered ones, about 10 inches tall, reach back to the nineteen thirties, and the best is one's own color choice: LAVENDER GLORY, SPECTRUM RED, CERISE QUEEN, or FLORADEL BEAUTY (for rose shades).

Nasturtiums (*Tropaeolum*). Dwarf semidouble globe types, dating back to GOLDEN GLOBE in 1936, are still popular foot-high edging and cutting subjects, best

of their group, for comparatively dry, sunny locations. They need spraying with such as a nicotine insecticide if plant lice appear.

Petunias are the most popular and useful of all annuals; they are good bedding plants and are useful also as tall edgers for paths, drives, and plant borders. There are dwarf petunias of 6 inches, as ROSE, PINK, BLUE, and VIOLET GEM, but these are not so versatile as the compact bedding sorts of 10 to 12 inches. CHEERFUL, salmon-pink; FIRST LADY, light pink; FIRE CHIEF, scarlet; IGLOO, creamy white; and VELVET BALL, ox-blood, are leaders of their coloring. Somewhat taller but with vigor and strength to hold themselves upright, are three winning hybrid petunias: COMANCHE, the new 1953 scarlet-red sensation; SILVER MEDAL, the 1949 salmon-colored beauty; and PINK SENSATION of 1948. These are glorious bedders, fine for cutting, outstanding petunias. Seeds are easily started indoors. This new type seems to outmode the regular *hybrida* type of 15 to 20 inches, although SALMON SUPREME, the rose-colored RADIANCE, and the ox-blood-red FLAMING VELVET are still worthy of wide demand.

All-double petunias, used more as pot plants and for window and porch boxes, but also for bedding, are more expensive because of scarcity of pollen for hand-pollination, but may be had in separate colors or in a balanced mixture of dwarf giants. COLOSSAL SHADES of Rose is a popular variety winner of 1946, first giant all-double to be produced in this hemisphere. The type and method of development originated in Japan, winning All-America recognition in 1934 with VICTORIOUS (mixed).

Low Annuals for the Border

Cynoglossum FIRMAMENT, commonly called a Chinese forget-me-not, is a good sky blue, a color rare in the border.

Rudbeckia STARLIGHT is an improvement on the old black-eyed Susan.

Scabiosas PEACE (white) and HEAVENLY BLUE are good as cut flowers.



Bodger Seeds, author courtesy
Cosmos FIESTA.

Cockscombs (*Celosia*) FLAME OF FIRE (a scarlet pyramid) and ROYAL VELVET (dark red) are two of the newer varieties that are worth growing.

Yellow cosmos (*C. sulphureus*) now comes in the following varieties: ORANGE FLARE, orange yellow, YELLOW FLARE, clear golden, and FIESTA, with a flash of scarlet on golden petals.

Cornflower (*Centaurea cyanus*) JUBILEE GEM, a dwarf double, grows only a foot tall and serves as a needed edger.

Zinnias PERSIAN CARPET have appeared with interesting contrasting colors and bicolor effects with petals variously straight and twisted. BLACK RUBY is still the best dark, blackish maroon Pompon zinnia. ROYAL PURPLE is the best representative of the Giant Dahlia-flowered zinnias. Hybrids now enter the Giant zinnia field and we may look for winners there.

Taller Border Annuals

Marigold (*Tagetes*) DIXIE SUNSHINE is a comparatively tall variety; its advent in 1936 started the chrysanthemum-



Bodger Seeds photos, author courtesy
Cosmos RADIANCE.

flowered group. GLITTERS marigold of 1951 is the newest winner, 3 feet tall with canary-yellow flowers. MAMMOTH MUM, sulphur-yellow, is the largest-flowered; and LIMELIGHT is the lightest-colored, pale primrose-yellow, but less than 2 feet tall.



Tithonia TORCH.

Larkspurs (*Delphinium*) BLUE BEL and WHITE KING have held their lea among Giant Imperial larkspurs since 1934 and 1937 respectively. This is the upright type, reaching 3 to 4 feet, with basal branching and long spikes of flowers.

Tithonia TORCH, about 4 feet tall, is bushy, hedge-type plant with flame- or tangerine-red, single Mexican "sunflowers" for exotic cutting arrangements.

Sweet peas (*Lathyrus odoratus*). Spring flowering (now called Cuthbertson) sweet peas were 1940 All-America winners Rose, Pink, Blue, and Lavender, since given variety names, were the awarded sweet peas at that time. Other colors have been separated and named, giving a full color range to this more heat-resistant and most satisfactory garden type.

Spiderflower (*Cleome*) PINK QUEEN is ever interesting and very popular.

Cosmos SENSATION, a giant in pink and white, DAZZLER in dark red, and RADIANCE, red-banded pink, are useful as background plants in the border.

Annual **Hollyhock** (*Althaea rosea*) INDIAN SPRING is ever welcome in its rose pink tones.



Zinnias PERSIAN CARPET (page 13).

HERBACEOUS PERENNIALS

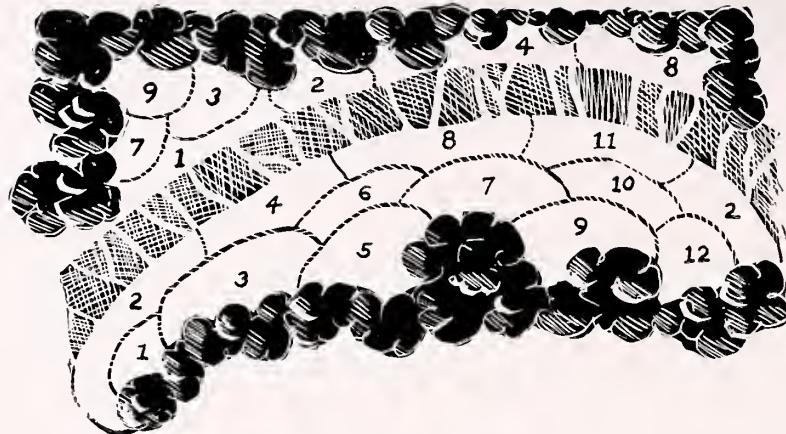
*A selected list, chosen for special uses and situations,
with suggested plans for combinations in planting*

Alfred C. Hottes

Continuous Bloom, April to October

Plants listed approximately in the order of blooming.

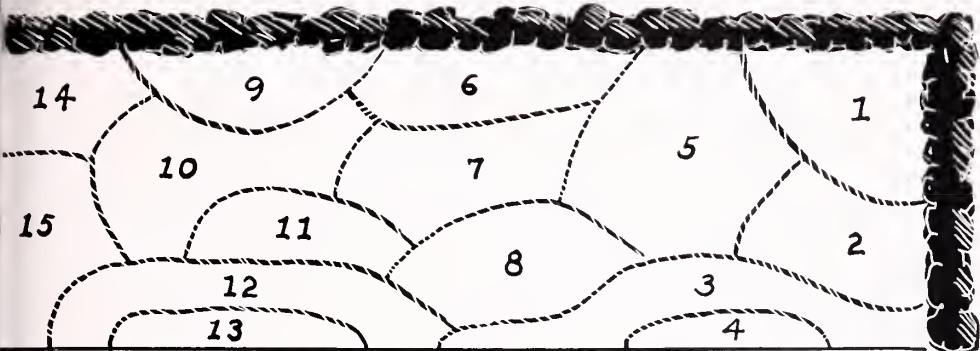
Number on Plan	Plant	Height in Feet	Color	Other Features
11	golden-tuft, or golddust (<i>Alyssum saxatile</i>)	2/3 to 1	golden	soft yellow in var. <i>luteum</i>
2	delphinium	1 to 4 (6)	mostly blue	pink or white
6	Siberian iris (<i>Iris sibirica</i>)	1½ to 3½	lilac	sometimes white
10	sweet William (<i>Dianthus barbatus</i>)	1 to 2½	red-and-white, pink, purple, white	sometimes double
3	day-lily (<i>Hemerocallis</i>)	1 to 4	yellow to reddish	large flowers
1	rose PAUL'S SCARLET CLIMBER	indefinite	scarlet	large flowers
9	hardy phlox	1 to 5	white, pink	blue, red
12	dropwort (<i>Filipendula hexapetala</i>)	1 to 3	white	has fernlike leaves
13	Shasta daisy (<i>Chrysanthemum maximum</i>)	1 to 2½	white	large heads
7	mist-flower (<i>Eupatorium coelestinum</i>)	1 to 3	blue	
4	Japanese anemone (<i>Anemone japonica</i>)	1 to 2 (3)	white, pink	flowers good for cutting
5	hardy aster variety (<i>Aster</i>)	1 to 5 (8)	white, red, blue, purple	
8	chrysanthemum	1 to 4 (7)	white, red, pink	purple, yellow



Author drawings

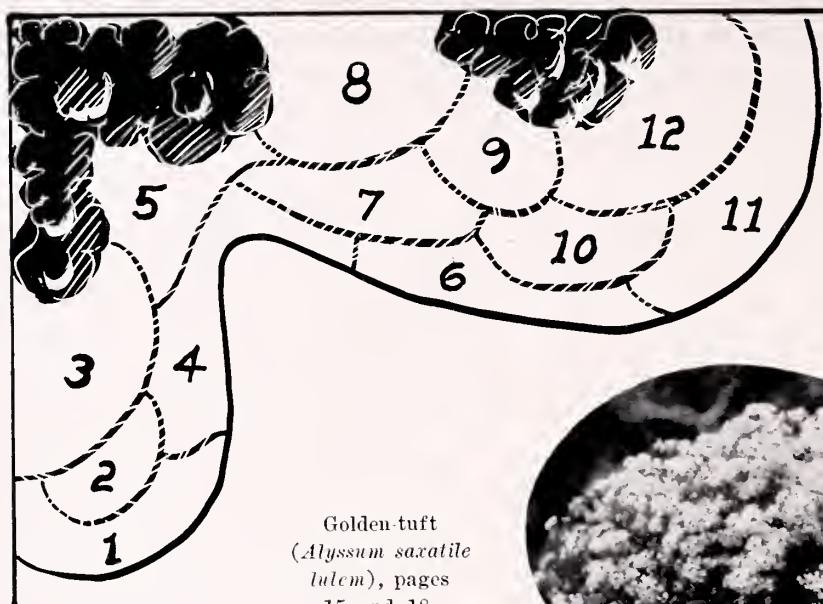
A Shady Path

Number on Plan	Plant	Height in Feet	Color	Time of Bloom	Other Features
1	fragrant plantain-lily (<i>Hosta plantaginea</i>)	1½ to 2½	white	late summer, fall	ample leaves
2	blue phlox (<i>Phlox divaricata</i>)	1 to 1½	bluish, pinkish, white	spring	fragrant
3	Virginia bluebells (<i>Mertensia virginica</i>)	1 to 2	blue	spring	pink buds
4	moss-pink (<i>Phlox subulata</i>)	½	pink, purplish, white	spring	evergreen
5	bee-balm (<i>Monarda didyma</i>)	3	scarlet	late summer, early fall	native
6	gas-plant (<i>Dictamnus albus</i>)	2 to 3	white (pink, violet)	early summer	strong-smelling
7	columbine (<i>Aquilegia</i>)	mostly 1 to 3	white, blue, lavender, red, yellow	mostly spring and summer	blooms in 15 months from seed
8	wavy-leaved plantain-lily (<i>Hosta undulata</i>)	1½ to 3	pale lavender	late spring	variegated leaves
9	Japanese anemone (<i>A. japonica</i>)	1 to 2 (3)	white, pink	fall	good for cutting
10	Yunnan meadow-rue (<i>Thalictrum dipterocarpum</i>)	2 to 7	rose or lilac	summer	dainty foliage
11	coral-bells (<i>Heuchera sanguinea</i>)	1 to 2	red (or pink or whitish)	summer	
12	gold-flower (<i>Hypericum moserianum</i>)	2	golden	summer	



A Dry Spot

Number on Plan	Plant	Height in Feet	Color	Time of Bloom
1	China-aster (<i>Callistephus chinensis</i>)	1½ to 2½	white, pink, blue, purple, violet	late summer, fall
2	coreopsis	1 to 5(10)	yellow, brown, pink	summer, fall
3	pink yarrow (<i>Achillea millefolium rosea</i>)	1 to 3	pink	summer
4	rose campion (<i>Lychnis coronaria</i>)	1 to 3	crimson	summer
5	bearded iris	up to 3 or 4	white, yellow, lilac, purple, brown	spring, summer
6	thinleaf sunflower (<i>Helianthus decapetalus</i>) SOLEIL d'OR	2 to 5	yellow	late summer, fall
7	hardy phlox	1 to 5	red, pink, purple, blue, white	summer
8	babys-breath (<i>Gypsophila paniculata</i>)	2 to 3	white	summer
9	sneezeweed (<i>Helenium</i>) CRIMSON BEAUTY	2 to 6	red (yellow, brown)	summer, fall
10	day-lily (<i>Hemerocallis</i>)	1 to 4	yellow, orange, reddish	spring, summer
11	sea-lavender (<i>Limonium latifolium</i>)	2	blue (white, rose)	summer
12	golden marguerite, or golden-camomile (<i>Anthemis tinctoria</i>)	2 to 3	golden	summer, fall
13	Hungarian speedwell (<i>Veronica rupestris, or latifolia</i>)	½ to 2/3	blue	summer
14	China-aster (<i>Callistephus chinensis</i>)	1½ to 2½	purple, blue, violet, pink, white	fall
15	small globe-thistle (<i>Echinops ritro</i>)	1 to 2	bluish	summer



Golden-tuft
(*Alyssum saxatile*
luteum), pages
15 and 18.

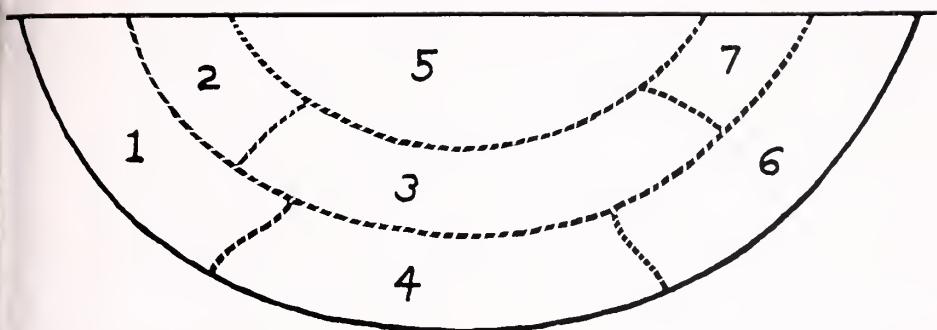
J. G. Bacher courtesy



A Spring Corner

(Or spring and early summer, according to the locality)

Number on Plan	Plant	Height in Feet	Color
1	Persian nepeta (<i>Nepeta mussini</i>)	2	blue
2	peony (<i>Paeonia</i>)	1½ to 4	red, white, yellow
3	Oriental poppy (<i>Papaver orientale</i>)	1½ to 4	scarlet, pink, orange
4	rock aster (<i>Aster alpinus</i>)	½ to 1	blue or violet
5	hollyhock (<i>Althaea rosea</i>)	6 to 9	red, pink, yellow, white
6	sweet William (<i>Dianthus barbatus</i>)	1 to 2½	red-and-white, pink, purple, white
7	columbine (<i>Aquilegia</i>)	mostly 1 to 3	blue, lavender, red, yellow, white
8	delphinium	mostly 1 to 4	blue (pink, white)
9	day-lily (<i>Hemerocallis</i>)	1 to 4	yellow, orange, reddish
10	painted daisy (<i>Chrysanthemum eoc-</i> <i>eincum</i>)	1½ to 2½	red, pink, lilac, white
11	golden-tuft, or gold-dust (<i>Alyssum</i> <i>saxatile</i>)	2/3 to 1	golden (soft yellow in var. <i>luteum</i>)
12	foxglove (<i>Digitalis</i>)	2 to 4	purple (reddish, white)



A White-flower Planting

Number on Plan	Plant	Height in Feet	Time of Bloom
1	sneezewort (<i>Achillea ptarmica</i>) PERRY WHITE	1 to 2	summer
2	Siberian iris (<i>Iris sibirica</i>) SNOW QUEEN	1½ to 3½	early summer
3	phlox MISS LINGARD	2½ to 4	summer
4	white tufted bellflower or white Car- pathian harebell (<i>Campanula car- patica alba</i>)	¾ to 1½	summer
5	Japanese anemone (<i>Anemone ja- ponica</i>)	1 to 2(3)	fall
6	edging, or evergreen, candytuft (<i>Iberis semperfirvens</i>)	½ to 1	spring, early summer
7	white bearded iris	up to 3 or 4	spring, summer



White Japanese
anemone
(*A. japonica
alba*) makes a
good back-
ground plant.

McFarland

DISEASES AND PESTS OF PERENNIALS

General suggestions. Specific directions are given on the containers of the control materials

Just when growth starts in the spring, the good gardener sprays everything—the soil as well as the sprouting perennials—with **Bordeaux** mixture. This kills the spores of many troublesome diseases, especially peony bud rot, hollyhock mildew, and phlox mildew. Peonies should be sprayed three times: first, when they are 2 to 3 inches tall; twice more at two-week intervals. **Fermate**, a newer fungicide, is also used (as a dust or spray) on peony and phlox. **Sulfur** dust is best on hollyhock.

Certain **virus diseases** cause plants to be stunted, yellow, or mottled. These diseases are carried by thrips, leafhoppers, aphids, and other sucking insects. The insect punctures the plant and in so doing injects the virus that causes the disease. The whole plant becomes infected; therefore it is not sufficient merely to remove the visibly affected parts; the entire plant must be pulled up and burned. We can do nothing about viruses except prevent them. Spraying with **DDT** will control the insects; growing the plants in cloth houses will keep out the insects and thereby prevent the disease. Aster yellows, lily mosaic, and tomato mosaic are caused by viruses; so are striped tulips, which we admire in spite of their diseased condition.

For late spring and summer control,

nicotine sulfate (such as Black Leaf 40) is a satisfactory general spray for insects such as aphids. These sucking insects also occur on the roots of many plants; their presence can be suspected when the plants wilt badly. Lead arsenate or nicotine dust worked into the soil around the afflicted plant will control them.

Another general spray is one containing **rotenone**—a nonpoisonous material which will control the soft-bodied sucking aphids as well as chewing insects such as the cucumber beetle. Delphiniums particularly, should be treated in early April with a 1 to 400 rotenone spray such as Red Arrow.

DDT should be used only for thrips—sucking insects which occur on gladiolus and foxgloves. The use of DDT as a general spray encourages red spider in dry hot weather (see foot of page).

Fall care for the garden means clearing up and burning any diseased plants or leaves. Iris, hollyhock, peony, and phlox stems and leaves should always be burned, for they might be harboring infection which could be carried over to the following year. Stems should be cut back to the soil level so that rot and infection cannot enter the remaining plant parts. A clean border means a healthy border.

Spring

Bordeaux mixture (fresh and blue).
Sulfur dust.

Late Spring and Summer

Nicotine sulfate (for aphids) or a rotenone-pyrethrum spray.
Pull and burn stunted plants to destroy mite, virus, nematode.

Fall

Burn stems and leaves of hollyhock, iris, phlox, peony, delphinium.

DDT only for thrips and leaf hoppers. Dimate, Aramite, or Ovotran for red spider on plants sprayed with DDT.

VEGETABLES FOR THE HOME GARDEN

Selected list of suitable varieties, with brief descriptions

James H. Burdett

THE amateur vegetable gardener prefers a long harvest, so that a single sowing will yield vegetables of good quality for a long time. The market gardener wants the crop to mature all at once and be harvested in one or two trips over the field.

Amateurs rate tenderness and flavor as supreme; they cook their vegetables within a short time after picking them, to enjoy top quality. The market grower is compelled to select varieties that stand shipping and make a good appearance in the market bins days later.

Varieties for commercial use are sold in much greater quantity than varieties for home gardens, and so breeding is largely directed toward meeting market requirements. Hence new varieties are not necessarily the best for amateurs. The following list of home garden varieties is based on personal experience plus information gathered by inquiry among seed dealers as to the varieties that amateurs buy from them.

Beans

Wax: TOPNOTCH GOLDEN, 52 days. Productive, compact plant bearing 5-inch, creamy yellow pods, straight, oval, stringless, brittle.

PENCIL Pop, 55 days. Heavy producer over long period, 6-inch, oval pods, stringless and free from fiber.

Green: CONTENDER, 49 days. Earliest, good quality, round-pod, disease-resistant variety, with heavy yield for long season.

LANDRETH'S STRINGLESS, 50 days. Excellent for heavy soil, stringless, round, straight, yielding a continuing crop.

TENDERGREEN, 52 days. Straight, round, stringless pods of top quality, 6 inches long. These win at the shows.

Lima, bush: FORDHOOK 242, 73 days. On large, erect bush this bears good crop of large, plump, white seeds, excellent frozen.

Lima, pole: KING OF THE GARDEN, 88 days. Covers a trellis with deep green leaves and produces large pods bearing five to six largest-size beans.

Green, pole: KENTUCKY WONDER, 65 days. If abundant long pods are picked when young and stringless, it bears all summer.

BLUE Coco. Old European variety, with long purple pods which cooking turns green, highly esteemed by gourmets.



All-America Selections, author courtesy

A good crop of bush beans.

Beets

DETROIT DARK RED, 55 days. Uniform, smooth globular roots are sweet, tender, and rich red inside and out. Long season.

IMPROVED EARLY EGYPTIAN, 45 days. Earliest, good quality and color, roots rounded on top and flat beneath, sweet, fine texture.

Cabbage

Early: EARLY JERSEY WAKEFIELD, 62 days. Conical heads and small outer leaves favor close planting. Produces small tight heads.

Midseason: COPENHAGEN MARKET, 75 days. Earliest large round-heading, excellent for summer use either raw or cooked.

Late: DANISH BALLHEAD, 105 days. Largest heads of flattened ball shape, firm and heavy, keep well in storage.

Savoy: CHIEFTAIN, 88 days. Its crinkled leaves are delicately flavored, and delicious in combination dishes. Poor keeper.

Carrots

SCARLET NANTES, 70 days. Slender cylindrical roots, bright orange, 6 to 7 inches, unsurpassed for tenderness and sweetness.

RED CORE CHANTENAY, 70 days. Of medium length with blunt end, richly colored throughout, and of excellent table quality.

Cantaloupes

IROQUOIS, 90 days. Deep orange flesh of fine texture and flavor, within tough rind, oval, 6½ inches in diameter, wilt resistant.

HONEYROCK (SUGAR ROCK), 85 days. Medium oval fruits have thick orange flesh and exceptional flavor; good yielder.

Cucumbers

MARKETER, 65 days. Uniform 8-inch slender fruits of dark green, suitable for salads and large pickles. Heavy yielder.

STRAIGHT EIGHT, 62 days. For exhibition, this will bear high percentage of straight 8-inch fruits of high quality.

EARLY SURECROP HYBRID, 64 days. First hybrid to mature, it has hybrid vigor and bears heavily over long season.

Lettuce

Butterhead: BIBB (LIMESTONE), 57 days. Small, loose-heading, it is popular for crisp, tender leaves; but it bolts in hot weather. Best for planting in spring or fall or in greenhouses.

Leaf: OAK-LEAF, 40 days. An old variety popular for crisp tenderness and resistance to heat; gives long harvest.

Crisp-head: GREAT LAKES, 75 days. Of all ICEBERG strains, this is most resistant to heat and tip burn. Heads in most localities.

Onions

SOUTHPORT YELLOW GLOBE, 110 days. Several strains of this type are available, all good for winter keeping.

SWEET SPANISH (UTAH strain), 110 days. Sown early in flats, then moved to garden, matures large, mild globular onions by late summer. Hybrid strains now available are earlier.

Peppers

Sweet: CALIFORNIA WONDER, 75 days. Mild, sweet, 4-lobed fruit, 4 by 4½ inches, scarlet when ripe. Should be sown early and transplanted to garden.

Hot, long: RED CAYENNE, 70 days. A dependable source of the flavor that hot peppers contribute to cooking. Good yielder.

Radishes

EARLY SCARLET GLOBE, 23 days. First crop harvested from seed, turns pithy fast. A week's supply should be sown every week up to hot weather.

ICICLE, 27 days. Mild, good flavor, with longer harvest before turning pithy. Should be sown every ten days or two weeks.

Spinach and Chard

Spinach: NOBEL or NOBEL GIANT THICK-LEAVED, 45 days. Should be sown as early as soil can be worked. This gives long harvest, but hot weather ends it.

Swiss chard: FORDHOOK, 57 days. Dark green crinkly leaves can be cut all summer but should not be allowed to grow over 10 inches tall.

New Zealand spinach: 60 days. Sow early, before frost ends, for quick germination of large seeds; cut only tips of stems.

Squash

TABLE QUEEN (DES MOINES, ACORN), 80 days. Really a pumpkin, this Indian variety is a splendid winter keeper, sweet as any, and a heavy yielder.

ZUCCHINI, 60 days. Fruits of this Italian marrow are delicious when only a

few days old and when older. Bears all summer if fruits are picked off.

Tomatoes

Early: EARLIANA, 66 days. Dependable, yielding large, bright red fruits of good quality over long season. Can be staked and pruned.

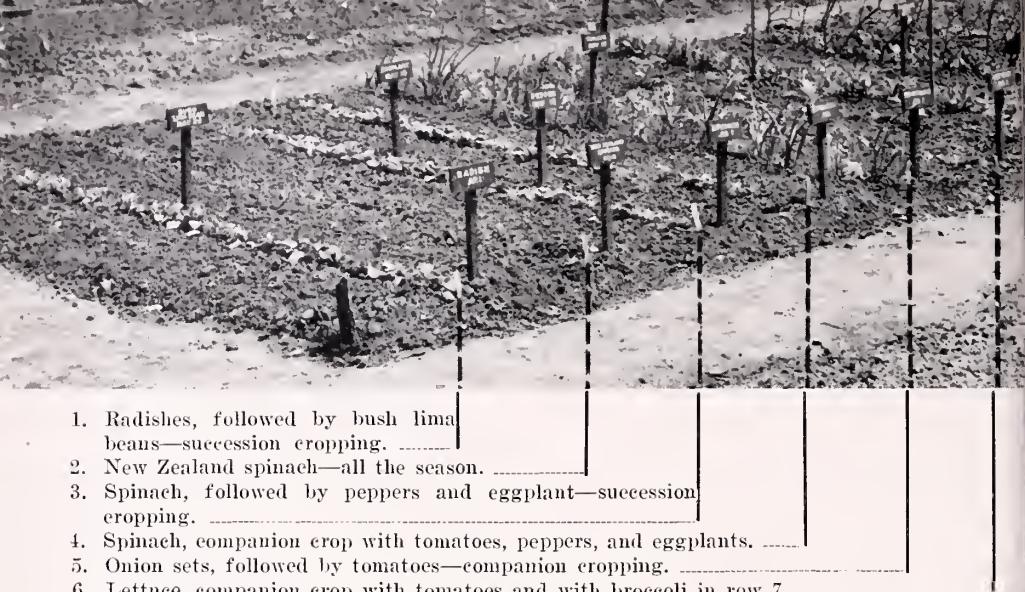
Main Crop: MARGLOBE, 77 days. Wilt resistant, heavy yielding, bearing until fall; globular red fruit, good for salad or for canning.

Yellow: JUBILEE, 80 days. Mature fruits average a pound, with deep orange skin and flesh and mild nonacid flavor; vigorous grower; best yellow variety.

One of the largest: ITALIAN POTATO-LEAVED (GIANT TREE), 90 days. Vine of exceptional vigor; fruits often exceeding 2 pounds, smooth, globular, with few seeds and mild flavor, borne in abundance. Good for exhibition.



Vegetable garden in early summer: onions, beets, carrots, parsnips, Swiss chard.



1. Radishes, followed by bush lima beans—succession cropping.
2. New Zealand spinach—all the season.
3. Spinach, followed by peppers and eggplant—succession cropping.
4. Spinach, companion crop with tomatoes, peppers, and eggplants.
5. Onion sets, followed by tomatoes—companion cropping.
6. Lettuce, companion crop with tomatoes and with broccolini in row 7.

Rows 18 inches apart.

VEGETABLE GARDEN PLAN

A 20- by 40-foot plot, planned for companion cropping and succession cropping, to get the maximum harvest from a small area

The rest of the rows, not shown in the photograph above, were planted thus:

7. Broccoli—all the season.
8. Peas, dwarf, early.
9. Cabbage, late.
10. Peas, dwarf, midseason.
11. Celery, all the season.
12. Cabbage, early, followed by beets.
13. Kohlrabi, followed by carrots.
14. Onion sets, followed by carrots.
15. 16. Onions from seeds, all season.
- 17 and 18. Beets, followed by bush beans.
19. Swiss chard and salsify, each half of the row, all the season.
- 20 and 21. Bush beans, followed by beets.
- 22 and 23. Carrots, followed by spinach.
- 24 and 25. Parsnips, half of each row, all the season. The other half of the two rows occupied by three rhubarb plants (3 feet apart)—perennial.

This is a plan that has proved successful; but certain substitutions may be made, to suit individual tastes. Radishes, spinach, lettuce, and onion sets, all very short-season crops, are interchangeable in succession and companion cropping.

Whenever possible, root crops are followed by top crops in succession cropping, and top crops by root crops. More tomatoes may be planted instead of eggplant and peppers—and so on.

Important Pests on Vegetables, and Their Control

Aphids, on cabbage, melons, tomatoes, broccoli: Red Arrow or Black Leaf 40 spray.

Cabbage worms, on cabbage, broccoli: rotenone spray or dust.

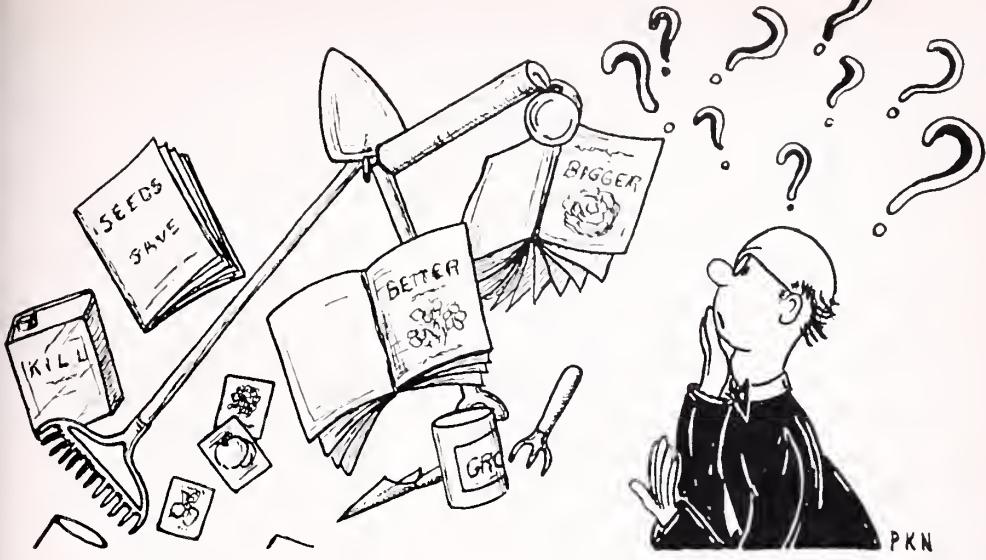
Cut worms, on tomato seedlings: paper collars around stems, extending 2 inches below soil surface.

Flea beetles, on cabbage, peppers, tomatoes: rotenone spray or dust.

Maggots, on cabbage, onions: calomel (mercurous chloride) on soil; or tar paper collar on cabbage seedling.

Mexican bean beetles, on beans: rotenone spray or dust, or methoxychlor, on both sides of leaves.

Squash borers, on squash: slit stem, kill borers, mound soil over wound.



HELPS TO EFFICIENCY

*Advice to beginners on sources of information
and ways of avoiding a few common pitfalls*

Alys Sutcliffe

MANY a would-be gardener is at a loss to know how to get the information and the supplies that he needs. He does not know where to learn about gardening, either directly or through books; or where to buy plants, seeds, fertilizers, sprays, and tools.

He is often carried away by advertisements offering cheap plants of unknown origin; innumerable novel appliances, or gadgets, guaranteed to take all the work out of gardening; and sprays and weed killers guaranteed to make the garden grow and weeds disappear without any effort on anybody's part—least of all the gardener himself. A person thus misled finds himself, in the end, surrounded by dead and dying plants, enough bottles to stock a drug store, and enough tools to supply the neighborhood—without the remotest idea what to do with them himself.

Information

Short courses are given in many towns and cities by garden clubs, botan-

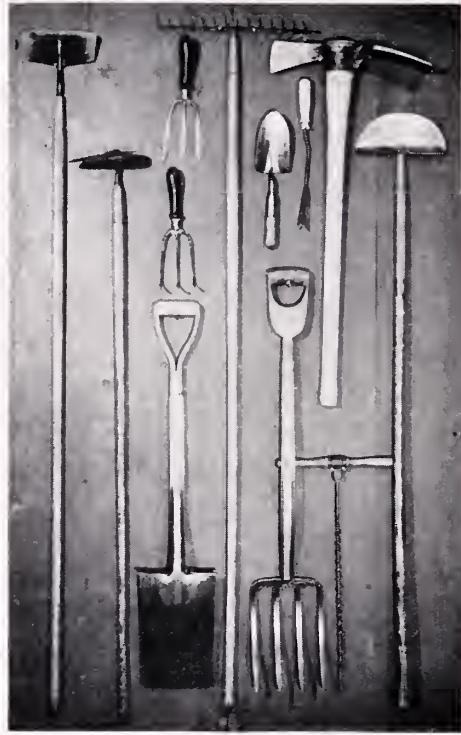
ic gardens, community centers, and schools. Some of these are on gardening, and usually they can be very helpful.

Questions sent to garden editors of papers and magazines are always answered. Botanic gardens generally give information by letter and by telephone.

Libraries of botanic gardens and horticultural societies have good collections of books on gardening for beginners and for experienced gardeners. Public libraries, at least in the larger towns, have the important garden encyclopedias and the more popular garden books. The gardener can look these books over and decide which ones would be most useful for him to own. (Page 27.)

Plants

Catalogs are published by all reputable dealers. Most of these are sent free on request; and while there is a small charge for some, they are well worth it. Dealers with good reputations of long standing are safest for beginners.



Garden tools: *left to right*, scuffle hoe, draw hoe, weeding fork, weeder, spade, rake, trowel, asparagus knife, spading fork, mattock, auger, sod cutter. Not everyone needs both kinds of hoe, or both weeding fork and weeder. Many gardeners have no use for asparagus knife, mattock, auger, and sod cutter.

Visits to nurseries are a great help; these should be made when plants are in full flower or growth. In this way one can choose the plants he likes and

get a better idea of price in relation to size.

Plants become adjusted more quickly if they are bought from nurseries in the same locality as the garden in which they are to be planted.

Plants should look healthy when they are delivered and must be properly cared for after they are received. The nursery is not to blame if plants suffer from being left in a hot dry cellar until someone finds time to plant them.

Fertilizers and Sprays

Soil samples are tested, and advice on fertilizers given, by state experiment stations and agricultural colleges. A small fee is charged; but it saves time and money, in the end, by enabling the gardener to choose the right fertilizer in the first place instead of learning by trial and error.

New sprays are continually coming out, and it is difficult to say which may prove best. It is important to understand that no one spray is good for everything. When one finds a spray that is good for a certain required purpose, he should usually stick to it. The directions that come with the spray must always be followed carefully.

Tools

The gardener should find out the purposes of tools and appliances before he buys them, and should learn how to use and take care of those he does buy. A few good tools, well chosen, intelligently used, and kept clean will take adequate care of the average garden.

For Information

- Take courses.
- Ask questions—of those who know.
- Visit libraries.
- Study a few good garden books.

For Plants

- Visit nurseries.
- Buy of reliable firms.
- Buy healthy plants.
- Take care of the plants.

For Supplies

- Have soil tested, for guidance in fertilizing.
- Don't try every new spray and appliance indiscriminately.
- Learn how to use sprays and tools correctly.
- Don't expect miracles.

BOOK LIST

A selected list of gardening books suitable for beginners

General

America's Garden Book, by Louise and James Bush-Brown. Published by Scribner's, New York, 1947. 1240 p., \$4. **Gardening**, by Montague Free. Published by Harcourt, Brace, New York, 1947. 550 pages, \$4.75.

The Weekend Gardener, by Dorothy Jenkins. Published by Rinehart, New York, 1950. 280 pages, \$2.75.

Learning to Garden, by Olive Gunnison. Published by Funk and Wagnalls, New York, 1948. 388 pages, \$2.85.

Landscaping

Beautify Your Home Grounds, by Peter Rhodes. Published by Homecrafts, New York, 1952. 90 pages, \$1.50.

How to Build Garden Structures, by Henry B. Aul. Published by Sheridan House, New York, 1950. 384 pages, \$3.50. Also **How to Beautify and Improve—and How to Plant—Your Home Ground**; two books, same author, publisher, size, price. 1949, 1953.

Soil

Our Garden Soils, by Charles E. Kellogg. Published by Macmillan, New York, 1952. 232 pages, \$4.

Propagation

Plant Propagation, second edition, by E. J. King. Published by Farrar, Straus & Young, New York, 1952. 264 pages, \$4.

How to Increase Plants, by Alfred C. Hottes. Published by De La Mare, New York, 1949. 279 pages, \$3.

Trees and Shrubs

Shrubs and Vines for American Gardens, by Donald Wyman. Published by Macmillan, New York, 1949. 442 pages, \$7.50.

Trees for American Gardens, by Donald Wyman. Published by Macmillan, New York, 1951. 376 pages, \$7.50.

Book of Shrubs, second edition, by Al-

fred C. Hottes. Published by De La Mare, New York, 1931. 437 pages, \$1.

Anyone Can Grow Roses, by Cynthia Westcott. Published by Van Nostrand, New York, 1952. 147 pages, \$2.

Garden Flowers and Lawns

How to Grow Annuals, by Ann Roe Robbins. Published by Macmillan, New York, 1949. 300 pages, \$3.50.

Perennials Preferred, by Helen Van Pelt Wilson. Published by Barrows, New York, 1945. 256 pages, \$2.75.

Bulbs for Home Gardens, by John C. Wister. Published by Oxford University Press, New York, 1948. 270 p., \$5.

Wild Flowers for Your Garden, by Helen S. Hull. Published by Barrows, New York, 1952. 280 pages, \$4.95.

How to Grow and Keep a Better Lawn, by Joseph Flynn. Published by Simon and Schuster, New York, 1951. 74 p., \$1.

Garden Troubles

The Plant Doctor, third edition, by Cynthia Westcott. Published by Lippincott, New York, 1950. 231 p., \$3.

The Gardener's Bug Book, by Cynthia Westcott. Published by American Garden Guild and Doubleday, Garden City, New York, 1946. 590 pages, \$4.95.

The Gardener's Trouble Shooter, by Victor H. Ries. Published by Sheridan House, New York, 1952. 320 pages, \$3.50.

Weed Seedlings, by Anna P. Kummer. Published by University of Chicago Press, 1951. 435 pages, \$5.

Vegetable Gardener's Handbook on Insects and Diseases, revised edition, by W. H. White and S. P. Doolittle. United States Department of Agriculture Miscellaneous Publication 605, 1951. 30 pages, 20¢.

House Plants

All about House Plants, by Montague Free. Published by American Garden Guild and Doubleday, Garden City, New York, 1946. 329 pages, \$3.50.



HOUSE PLANTS

*Suggestions for their care both winter and summer;
how to keep them healthy and free from pests*

Alfred C. Hottes

General Care

ONE who has good healthy house plants usually has many of them. Why? Because when plants are grown by the tableful they give off enough moisture to create a humid atmosphere around the group. To increase the moisture in the air one can use evaporating dishes on the radiators or set the plants on tables or shallow pans filled with sand, fine gravel, or peat moss—kept moist.

Watering. No one can say how often a plant needs to be watered. Fast-growing ones and those in bloom need the most water. Resting plants need much less—just enough to keep them from wilting, but not absolute drought. For watering African-violets (*Saintpaulia*) and other hairy-leaved plants, the pots should be placed in pans of water until the soil is moist; or self-watering pots may be used—with wicks that extend into a reservoir of water. Such pots can be bought or can be rigged up at home.

The soil for the pots should be fibrous.

To the usual garden soil one may add a commercial humus such as peat moss or leaf mold, to make the soil spongier.

Fertilizer should not be given to resting plants; but plants that are growing vigorously will benefit by a commercial liquid fertilizer to supplement the food in the potting soil.

Pots. Most people use pots too large for their house plants. A plant should not be repotted unless the ball of soil is covered with roots, as shown below.



Pinching. When a branch starts in a direction that spoils the shape of the plant, it should be pinched back. This causes the plant to branch and become more compact. The tall, ungainly house plants commonly seen are the result of hesitation to pinch the shoots before they become too long.

Washing. All house plants (i.e., all but those with hairy leaves or very delicate foliage) should be washed once a week with soapy water—1 to 2 ounces of soap flakes or powder to a gallon of water. If a detergent other than soap is used, only about half as much is needed. The soil can be kept in the pot by a piece of paper held over the top, and the whole top of the plant can then be swished around in the soap bath.

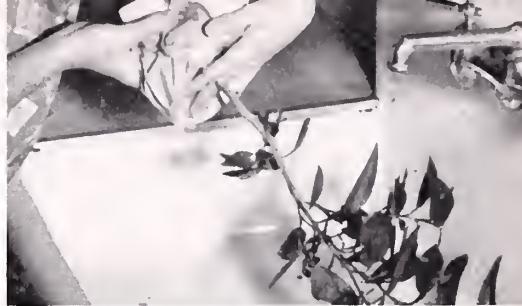
The temperature of the rooms in which plants are kept should be not above 70° F., preferably a little below.

Pests

Prevention. House plants that are kept clean by means of a weekly soap bath are not likely to become infested with insects; and when conditions of humidity and temperature in the home are made more nearly ideal for plants, the pests are less common. It is important to examine any new plants that are brought in, and treat them at once if they are infested; this helps to protect the other plants. If pests do become numerous, they can be controlled more easily with some of the small sprayers and dusters now available.

A good general preventive, in addition to the weekly soap bath, is a spraying about once a month with soapy water to which Black Leaf 40 has been added—or better, Red Arrow, which is not poisonous.

Aphids, or plant lice, are likely to be seen especially on plants that have been outdoors for the summer. They cluster on the tender growing tips and young leaves of plants of all sorts, and suck the juices. The soap bath recommended for regular cleanliness is a good means of getting rid of aphids when they appear. For a severe infestation, a spray



A house plant being washed under the faucet.

of nicotine sulfate may be used: a teaspoonful of Black Leaf 40 in a gallon of soapy water. For a very stubborn case, Volek, an oil spray, may be used. After the oil has been on the plant for several hours, it should be washed off; and it is better if the plant is kept in the shade all during the day on which the oil spray is used.

Mealy bugs (flat white oval bodies) are often found nestling around cactus spines and in the leaf axils of coleus and other plants. The regular soap bath or a weekly forceful spraying with clear water usually controls them; but if they persist, they should be drenched with alcohol from a small brush or cotton swab. Egg masses may be picked off with the fingers.

White fly, a tiny creature that darts away when the plant is disturbed, is difficult to control. Spraying every four or five days with a rotenone-pyrethrum spray or Volek oil spray is usually recommended; but for a bad infestation spraying several days in succession may be necessary. A nicotine-soap solution (mentioned for aphid control) sprayed on the under side of the leaves every four or five days may be sufficient in mild cases.

Scale insects are sometimes found on ivy stems and on ferns. They have flattened round, oval, or spherical bodies. When mature they are protected by a sealy coating which tends to resist sprays. Volek is most effective; or the insects can be removed by hand with a cloth or brush.

Red spider. When plant leaves become gray or speckled with yellow, the minute red spider mite may be at work; close



Left, potted begonia set in ground, on ashes to keep earthworms out. Turning pot occasionally keeps roots from becoming anchored in ground. *Right*, geranium removed from pot and planted out for the summer.

examination may show the leaves to be clothed with tiny silken webs covered with red mites. The mites thrive in hot dry air; the easiest and surest means of control is daily syringing of the plants and increased humidity in the air.

Summer Care

Many house plants are most easily

taken care of in the summer out of doors. Some may be put on the porch, some in a cold frame (if one is available); some may have their pots set in the ground, and some may be taken out of their pots and planted directly in the soil.

Geraniums may be planted in the ground, in full sun, and need very little watering.

Sansevieria may be set directly in the soil, with high shade, and needs almost no care.

Begonias may be placed in the ground in their pots, when the weather is really warm; they need partial shade and occasional watering.

Cactuses and other succulents do well in a rock garden, in full sun, and require only occasional watering.

Hanging plants and ferns may be hung on the wall of the porch; and other plants may be set on tables on the porch. Here they can be watered easily with the hose.

Plants should be taken indoors again before artificial heat is on.

General Needs

- Extra moisture.
- Moderately cool rooms.
- Individual watering.
- Fibrous soil.

Summer Care

- On porch.
 - In garden.
 - In shade.
 - In sun.
- Return to house before cold weather.

Control of Pests, When Present

- Aphids**
- Soap bath.
 - Black Leaf 40.
 - Volek.
- Mealy bugs**
- Soap bath.
 - Forceful spray.
 - Alcohol.

- Fertilizer—when actively growing.
- Pots not too large.
- Pinching—to keep good shape.
- Weekly soap bath.

Pest Prevention

- Cleanliness.
- Control of moisture.
- Control of temperature.
- Watchfulness.

- White flies**
- Black Leaf 40.
 - Rotenone-pyrethrum spray.
 - Volek.
- Scale insects**
- Volek.
 - Brush off.
- Red spiders**
- More moisture in the air.

COMMON SENSE IN THE GARDEN

A few important fundamental practices, designed to bring good results and to save trouble in the long run

Alys Sutcliffe

Soil Preparation

BEFORE either annuals or vegetables are planted, the ground should be thoroughly prepared. It is to be spaded to a depth of 9 to 12 inches, and organic matter incorporated at the same time—rotted manure, compost, or peat moss. If peat moss is used, lime should be added, roughly $\frac{1}{2}$ pound to a bushel of peat moss. Organic matter spread 2 to 3 inches deep over the surface is about the right amount to spade in.

After the digging is done, a complete

fertilizer (5-10-5) is put on and raked in; and the ground is leveled ready for sowing seed. Fertilizer is usually provided at the rate of 50 pounds for 1000 square feet. Half of this is raked in before the planting is done; and the rest is kept, to be sprinkled around the annuals or between the rows of vegetables after they are up.

Digging and raking should not be done when the ground is wet. If a handful of soil crumbles instead of forming a ball when it is squeezed, the ground may be worked.



Spading in manure.



Raking fertilizer in, and leveling the bed.

Seed Sowing

When danger of frost is over and the soil has warmed up a little but is not too wet, seed may be sown. This is usually between the middle and the end of April in the New York region. The seeds should not be covered with too much soil. The soil is made firm over the seeds.

Vegetables are usually sown in rows, the smaller seeds in drills about $\frac{1}{2}$ to 1 inch deep, larger seeds (such as beans) $\frac{1}{2}$ to 3 inches deep. The same rule applies to any seeds sown out of doors.

Annuals with fairly large seeds, such as zinnia, cosmos, marigold (*Tagetes*), and sweet-alyssum (*Lobularia*), are sown directly in the ground.

The finer-seeded kinds, such as petunia and snapdragon (*Antirrhinum*), are started indoors (see page 65) early in March (in the New York area), and transplanted to the garden about the time the larger seeds are sown outdoors.

Transplanting

When seedlings are moved from flats into the garden, or from one part of the garden to another, care should be taken not to cover the centers of plants that form rosettes—such as delphinium, columbine (*Aquilegia*), hollyhock (*Althaea rosea*), and lettuce. Plants with leaves visibly separated on the stem (such as petunia, snapdragon, tomato, and pepper) often benefit by being planted a little deeper than before.

Watering

For a good crop of vegetables, watering the garden in dry weather is almost essential; but it must be done thoroughly or not at all. The water should be allowed to soak in to a depth of about 6 inches. A light sprinkling does more harm than good.

Summer Fertilizing and Mulching

If the soil is fairly good, one more application of **fertilizer** is usually sufficient, in addition to that put on when the soil was prepared. Superphosphate is good for the flower garden, 5-10-5 for vegetables. The fertilizer may be scattered on the ground—rather generously—with the hand or with a trowel, and lightly cultivated in. June is the best time to do this, on a day when the soil is damp.

Also in June, at a time when the beds are free from weeds, a **mulch** may be put on. A layer of leaves, lawn clippings, or hay 2 to 3 inches deep will save much work of weeding and watering.

Garden Hygiene Pays

The annual and vegetable gardens benefit from a regular spraying program. DDT is a good spray for leaf hoppers; but it should be followed (in a day or two) by a rotenone or nicotine sulfate spray or the newer spray "Marvel," or aphids and red spiders will take over.

Mexican bean beetles and aphids are likely to appear in the vegetable garden by the time the bean plants have two or three leaves. Early and sometimes repeated sprayings are necessary for con-



Arthur Barrows

Summer mulch of straw reduces the problem of weeding.

trol. For these sprayings, as well as for other pests on vegetables, a nonpoisonous rotenone spray should be used, such as Red Arrow.

Ants in large numbers in the soil around a plant indicate the presence of root aphids, and the plant should be dug up. Tobacco dust, worked into the soil, will get rid of the aphids; and chlordane will get rid of the ants. Chlordane must

be handled carefully, as it is poisonous.

Directions for using pest-control chemicals are given on the containers and must always be followed carefully.

The whole garden should be kept **clean and tidy**; all dead flowers and leaves should be cut off. Any really diseased plants should be burned; this is more economical than trying to save them and is much safer for the other plants.

Soil Preparation

Dig in organic matter.
Rake in complete fertilizer.
Don't dig or cultivate wet soil.

Seeds—sow

When danger of frost is past.
At right depth—
 $\frac{1}{2}$ to 3 inches, according to size.
Not in wet soil.

Transplant

Deeper than before—
except rosette plants.

Water

Thoroughly or not at all.

Summer

Fertilize again.
Mulch.

Hygiene

Burn diseased leaves or plants.
Spray and dust
According to needs.
Early enough and often enough.
Follow authoritative directions.
Keep garden neat.

COMPOST

A must for every garden

Conrad B. Link

ORGANIC matter is an essential component of good soil. It is not a permanent part of the soil and so must be renewed continually. In the garden this organic matter may be supplied as manure or as compost. Animal manures are not easily obtained and are expensive, especially in or near large cities, and so most gardeners must use other types of organic matter. Peat is one of the well known types, easily handled and readily obtained. Local products useful for gardens are sometimes available, such as humus, shredded redwood bark, shavings, buckwheat hulls, ground corn cobs, and shredded sugar cane. They are not all of equal value, and some of them are better adapted for mulching purposes than for immediate incorporation into the soil.

The Home Compost Pile

The efficient gardener can produce much of the organic matter his soil needs by composting plant refuse—making artificial or synthetic manure. It is not difficult. A compost pile does not take up much space but should be hidden from view. Leaves provide the major garden waste material useful for composting but other materials may also be used, such as straw, hay, shavings, lawn clippings, and nongreasy kitchen waste.

Usually, a compost pile is built up gradually as materials become available. The first step is to make a layer of the **plant refuse** about 6 to 12 inches thick. (Diseased or insect-infested material must not be used but should be burned.) On top of this a light layer of lime should be sprinkled, and a complete fertilizer such as 4-12-4 or 5-10-5. About 100 pounds of fertilizer and 25 to 50 pounds of lime are sufficient for a pile of 125 cubic feet. The fertilizer provides nitrogen, which is needed by the bacteria of decomposition. This nitrogen later be-

B E A C O M



2 Sprinkle. Add fertilizer and lime. Continue layers until

4

6 Compost going to work to improve soil.



ST-MAKER

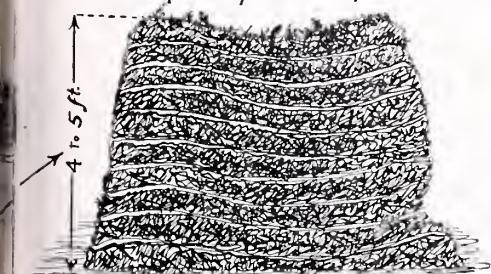
NOT A LEAF-BURNER!

Put your garden
work — as compost — for the
enrichment of your soil.

Step - a layer of leaves, straw,
grass clippings, garden plant
material



3 Compost pile completed



over the pile
3 months.



At last —
A good compost
9 to 18 months
later.

M.C.F. CARROLL

comes available to the plants. Phosphorus and potassium also are changed in such a way as to become more readily available to plants. Lime prevents the decaying material from becoming too acid, and provides more favorable conditions for bacterial action. The amount of lime used is not enough to produce an alkaline reaction, and so the compost may be used for plants that need an acid soil.

As more material becomes available, more layers with lime and fertilizer are put on, until the pile is 4 to 5 feet high. It is important that the material be moist enough to encourage decomposition. As the pile is built, each layer should be watered; and the entire pile should be watered in dry weather. The completed pile should have a depression on top, to catch the rain. Some gardeners put a sprinkling of manure or garden soil over each layer to add more bacteria.

After two to three months it is desirable to turn over the compost pile. This will help to aerate it and to mix the materials at the outside of the pile with those on the inside. Large piles built up all at once may heat rather quickly inside. This high temperature is often sufficient to kill many disease and insect pests.

During the summer usable compost can be made in four to five months. Compost made in the fall requires a longer time. The nature of the materials used also affects the time of decomposition; soft green plant material decomposes more quickly than dried leaves.

Home composting is an efficient and practical way of utilizing garden refuse — burning is wasteful of good materials.

Organic matter—is necessary to soil.
—must be renewed.

To make compost, use:

Plant refuse (not diseased):

Leaves, straw, hay, lawn clippings, nongreasy kitchen waste.

Water

Lime

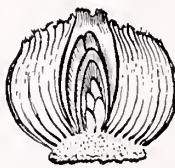
Fertilizer

BULBS— MYSTERIOUS BALLS OF WONDER

Suggestions for methods of planting, and plans for best garden effect

Alfred C. Hottes

WHENEVER I think of bulbs I am amazed at their ability to stand adversity. Some, such as hyacinths, tulips, daffodils (and other kinds of narcissus) are really enlarged buds with potential flowers and leaves all packed together until a time arrives when they can develop; someone has characterized them as convenient packages in which a plant is stored during drought and cold.



M. L. Carroll drawings

Hyacinth bulb: left, whole; right, cut lengthwise to show flattened stem, storage leaves, and mixed bud in center.

Other so-called bulbs are really only the enlargement of the base of a stem and should be called corms; examples of these are the crocus and the gladiolus. When underground stems are elongated they are called rhizomes; examples are bearded iris, canna, water-lily, and plan-

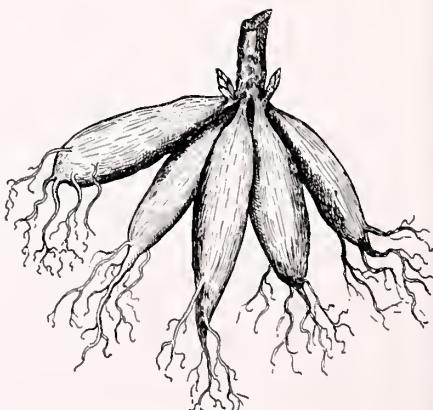


Crocus corm: left, whole; right, cut lengthwise.

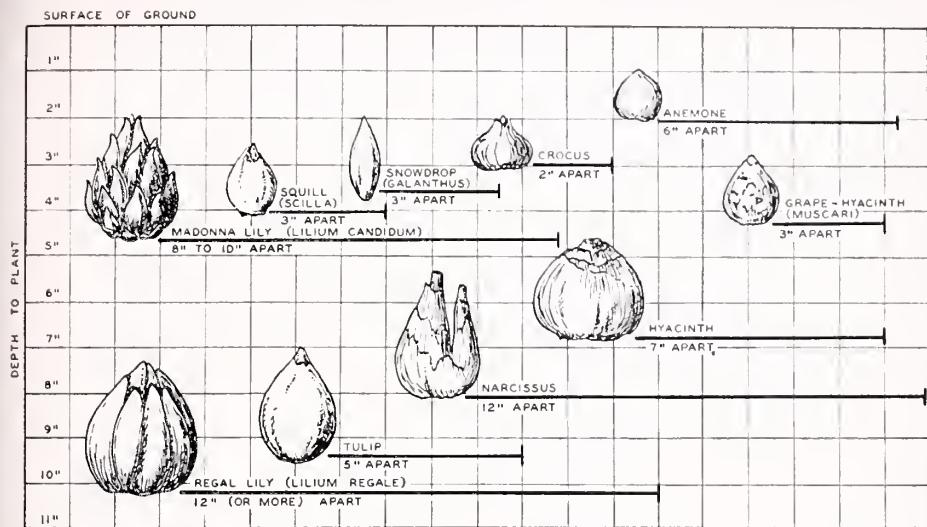


Iris rhizome, showing four years' growth.

tain-lily (*Hosta*). In each case the size of these structures—bulbs, corms, and rhizomes—depends upon the proper development of the leaves. The true bulb is mainly the thickened bases of leaves, the corm is the part of the stem of the plant



Tuberous roots of dahlia.



Bulb-planting guide.

in which food is stored, and rhizomes are the stems from which all the future leaves and flowers of the plant will arise. The moral of all this is: the leaves of a bulbous plant must develop fully after the flowers have faded and gone because it is only the leaves that can make the food necessary to produce the future flowers.

Planting

Soil. It is well to prepare the area by spading it deeply to break up the subsoil. When poor drainage is suspected, a tile may be put in, or each bulb set on a layer of sand.

Time. The hardy bulbs are planted in October, so that they may be rooted while the soil is still warm. Many of the

summer-flowering bulbs are tender and are therefore planted in the spring.

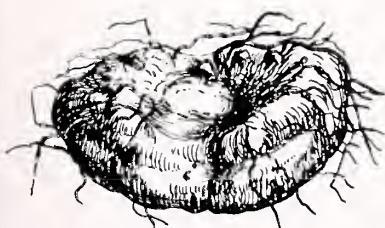
Depth. A safe rule for depth of planting is to plant each bulb at a depth at least three times its own diameter; and in most cases where the soil is well prepared, one may plant still deeper. Deep planting provides a cooler place for the roots and makes certain that the roots will be out of the way when the soil is dug at some later date for planting other flowers in the same bed.

The hole in which the bulb is planted must not be so narrow and pointed at the bottom that the bulb stops up the hole part of the way down and prevents soil from filling in below it. Such a hole is often made when a narrow trowel is used in planting; then the bulb has an undesirable air pocket below it, instead of soil.

Water the soil after planting, so as to settle it about the bulbs.

Digging the clumps and separating the bulbs is necessary in most cases only after three years or more.

Winter mulch. In cold climates there is a considerable amount of alternate freezing and thawing, especially in the



Begonia tuber.



Planting a bed of bulbs, with the bulbs in rows.



Planting bulbs in a clump, with layer of sand directly under bulbs.

spring. To avoid this in the bulb bed, a mulch of coarse material may be put on, to shade the surface of the soil and insulate it against the influence of the sun in the day, and the colder night. The time to apply this mulch is after the ground is frozen, the object being to keep it frozen. Applying the mulch too early defeats its purpose and also encourages the depredations of field mice and other rodents.

Plan

Most bulbs are well planted in clumps rather than in rows of individual plants; whole beds of bulbs are still better if there is room for them. The garden effect of six to a dozen bulbs in a clump adds to the beauty of the individual flower as well as to the general garden display. Combining the various kinds of bulbs is also advisable. With early double tulips, squills (*Scilla*) may be planted, and glory-of-the-snow (*Chionodoxa*), and snowdrops (*Galanthus*). Among the tall Darwins and the Cottage tulips Virginia bluebells (*Mertensia*) are good, and forget-me-nots (*Myosotis*), and blue phlox. Blue polemonium, purple pansies, and grape-hyacinths (*Muscari*) might be another combination. Later the tall perennials will cover the yellowing foliage. Some low-growing annuals may be sown among the bulbs, annuals such as *Nemophila*, Shirley poppies (a strain of *Papaver rhoes*), phlox, and larkspur (*Delphinium*). In most climates these may be sown at the time the bulbs are planted in the autumn, or scattered early in the spring.

Succession of Bloom from Bulbs

FEBRUARY

winter-aconite (*Eranthis hyemalis*)
snowdrop (*Galanthus nivalis*)

MARCH

crocuses
cyclamen-flowered daffodil (*Narcissus cyclamineus*)
glory-of-the-snow (*Chionodoxa luciliae*)
Siberian squill (*Scilla sibirica*)

APRIL

single early tulips
hyacinths (*Hyacinthus*)
grape-hyacinth (*Muscaris botryoides*)

MAY

Cottage and Darwin tulips
daffodils, followed by other kinds of *Narcissus*

JUNE AND JULY

tuberous begonias
summer-hyacinth (*Galtonia candicans*)
basket-flower, or Peruvian-daffodil (*Hymenocallis calathina*)
"hardy" begonia (*Begonia evansiana*)
gladiolus
tuberose (*Polianthes*)
tiger-flower (*Tigridia*)
lilies

AUGUST

hardy-amaryllis (*Lycoris squamigera*)
autumn-crocus (*Colchicum autumnale*)
cannas

SEPTEMBER

dahlias

Other articles on bulbs are in PLANTS & GARDENS, Fall, 1947, pages 134 to 175; Summer, 1949, pages 68 to 117; Summer, 1950, pages 93 to 96, 104 to 111, 118; Summer, 1951, pages 87 to 92.—ED.



McFarland

Border with many kinds of bulbous plants, including tulips, grape-hyacinths (*Muscari*), and nareissus.

Plant Bulbs

In clumps.

Several kinds in one bed.

Many kinds, for long succession of bloom.

Spring-flowering kinds in the fall.

Let leaves grow and die after flowers are gone.

Mulch after ground is frozen.

In well prepared, well drained soil.
Deep as three times diameter of bulb,
or deeper.

With soil or sand below, not air.

Summer-flowering kinds in the spring.

Divide after three years or more.

ROSES—THE BEST OF THE BEST

"Be not the first by whom the new are tried
Nor yet the last to lay the old aside."—Pope

David B. Watson

TO A rosarian all roses are beautiful; each has its own charm, though some may inspire greater wonder than others. We are told that in 1535 the world had but a dozen named varieties; and through the sixteenth, seventeenth, and early eighteenth centuries little is heard of the rose. Toward the end of the eighteenth century, the flower garden began to assert itself and to assume a place separate and distinct from the shrubbery and wild landscape; yet it is obvious that the rose still compared unfavorably with the quality and type known today. In the last 150 years the number of varieties has risen to thousands, from the miniature

fairy rose, or pygmy rose (*Rosa chinensis minima*)—some 4 to 6 inches in height—to the rambling Wichuraiana hybrids which may reach even 40 feet.

The most ardent rose lover would gain little pleasure from growing some of the inferior roses, even if they were procurable; but the process of improvement of some, and elimination of the rest, has left us with many distinct varieties of varied colors and types, which render service in their respective spheres. Here are some that I consider the best of the best.

Hybrid Teas

Resulting from crosses between the Hybrid Perpetual and the Tea-scented roses, the Hybrid Teas are now the most popular of all garden roses. They flower freely, early and late in the season; and within their ranks can be found every kind and every quality of rose suitable for any and every purpose—but chiefly for formal bedding and exhibition.

MRS. SAM McGREDY is beautiful in all her phases, and no garden is complete in her absence. The long, pointed, and beautifully formed buds develop into full, high-centered blossoms carried erect on long stems, and open well in hot or wet weather. The color is a fascinating combination of scarlet and coppery orange, almost impossible to describe. The habit is vigorous and upright; and the foliage and stem are also of a bronzy red color.

PEACE is a superlative rose and fast becoming the best-known variety. If we place the first of every class at a rose show in one container and ask for a popular vote of the spectators, PEACE wins



McFarland
Climbing rose AMERICAN PILLAR.

every time. At no time in the past have we had such growth, foliage, size of flower, and free-flowering qualities in any one variety. Some think it should be considered a new type. The hybridists are using it much as a parent for new crosses. Though variable in color—a pale yellow suffused with varying degrees of pink flush—the plant and its name are symbolic of the best.

CHARLOTTE ARMSTRONG has usurped the place that CRIMSON GLORY (one of its parents) held in my esteem for a long time. With its long-pointed, blood-red to rose-carmine, high-centered, long-stemmed flowers on a strong upright-growing bush, it is a supreme outdoor rose that can qualify as a bedding, decorative, and exhibition rose.

GOLDEN SCEPTER is the deepest yellow to date; it is an introduction from abroad, where it was acclaimed by the connoisseurs. A formal bed of this variety is outstanding. Given just a little more attention than the general run of roses, it can be superb. A good tall grower, it has a continuity of bloom not found in others of its class. When disbudded, its delicious tea fragrance makes it a desirable cut flower. I feel sure it has a good future.

Climbers

G. A. Stevens said "The most rabid Hybrid Tea enthusiast cannot long resist the stately beauty and infinite variety of climbing roses, and eventually he is compelled to use them to complete his garden picture." What would June and July in the American garden be without these roses?

The climbing Hybrid Tea is a sectional rose and is most worth while where the winters are favorable to it; but to be superlative, a climber should be universal. Of the hundreds of climbing and pillar roses about fifty are universal and a few of these are superlative. Such are the following, in my estimation.

AMERICAN PILLAR has weathered the popularity contests for nearly fifty years. It quickly covers anything that needs a mantle of green; and in many gardens, especially those in the making, this is

almost as important as its profusion of flowers. In freedom of bloom and in lasting quality, no single-flowering rambler is its peer. Its late-season blooming habit is highly valuable; and its abundant trusses of pink flowers with white eye and golden yellow stamens, provide charm wherever it is planted.

PAUL'S SCARLET holds the front rank and has a habit of growth suitable for low walls, pergolas, pillars, and screens. What a long-felt want this rose has supplied! How well it deserves its popularity as the best seller! After all, the life of a variety rests entirely on the verdict of public opinion. Many good roses have passed out of our ken because of their faults; it will be a long, long time before PAUL'S SCARLET follows them into oblivion—with its freedom and continuity of bloom, its immunity from disease, and its evergreen tendencies.



McFarland
Hybrid Tea rose PEACE.



McFarland
Floribunda rose GOLDLLOCKS.

DR. VAN FLEET dates me as old-fashioned but it endures a lot of unfavorable conditions. It is one of the most attractive of climbers for its intoxicating fragrance; and the delicacy of its substantial flesh-pink flowers, persistent in all kinds of weather, renders it an acquisition to any garden. It is outstanding for freedom of bloom, lasting quality, and resistance to disease. Pruning out the old wood and leaving vigorous young growth from the base will preserve its youth almost indefinitely.

MRS. ARTHUR CURTIS JAMES is a pride and joy for those who can wait the five years that it takes to reach its zenith. The semidouble, clear bright yellow blossoms are good for cutting and do not fade; and when the plant covers an area 24 feet square in a blanket of purest yellow, long-stemmed flowers for nearly ten days, the neighbors will beat a track to garden gate to see it.

After the foregoing, MARY WALLACE (a rich pink) and DR. HUEY (a dark red) are superlatives on my list.

Polyanthas and Floribundas

For those who desire the best in economical display, with little or no trouble beyond the annual pruning and occasional loeing, there can be nothing more delightful than beds of blended Polyanthas and Floribundas. Both of these classes are largely displacing ordinary bedding plants, to the aesthetic improvement of the gardens and the saving of much annual expenditure by the owner.

Polyantha roses are very hardy plants from 12 to 36 inches tall, bearing large trusses of constant-blooming small pomponlike flowers. The gardener can start with the following nonfailing varieties, still listed by many nurserymen: CECILE BRUNNER, GLORIA MUNDI, MARGO KOSTER, GOLDEN SALMON, and THE FAIRY.

Floribundas. Destined to become the most superlative of roses are the recent crosses of Polyanthas and Hybrid Teas, now accepted as a class of their own under the name of Floribundas. More fragrance, substance, and size are furnished here, but the tendency to large trusses is disappearing. Every authority accepts these roses as the *pièce de résistance* for park, roadway, and drives, and for border and foundation planting. I will vouch for the following five each of the old and newer varieties, ranging through red, pink, white, yellow, salmon, and orange colors. DONALD PRIOR, ELSE POULSEN, SALMON SPRAY, DAGMAR SPATH, and WORLD'S FAIR are tried and true; while FLORADORA, GOLDLLOCKS, CARROUSEL, PINOCCHIO, and VOGUE are setting the style for future fashion in roses.

Shrub and Species Roses

The border shrubbery and the general landscape would have a void in my rosarian mind if the roses of nature had not long since proved their efficiency. These roses include sizes to suit all areas, with habits adaptable to many sites and situations. FRAU KARL DRUSCHKI, GENERAL JACQUEMINOT, HENRY NEVARD, and PINK and RED GROOTENDORST are spectacular shrubs when well grown.

Enjoyed for their attractive fruits and ornamental leaves and stems, which make a strong appeal, especially to those shrub growers who have a kindlier eye for the species than for garden hybrids, here are the best: *Rosa moyesi*, *R. pomifera*, *R. rubrifolia*, *R. omeiensis*, and *R. hugonis*. Here I revert to the simple life, to nature's superlative artless beauty, with those five symmetrical little petals surrounding the mysterious and alluring centerpiece of stamens.

There are of course many other roses that can be relied on to give good service; but those mentioned here have never disappointed me. This selection is not meant to be comprehensive; but it represents my choice after watching the birth, life, and death of new roses over the past forty years.

McFarland

Rosa moyesi, one of the best of the species roses.



Hybrid Teas

MRS. SAM McGREDY

PEACE

CHARLOTTE ARMSTRONG

GOLDEN SCEPTER

Polyanthas

CECILE BRUNNER

GLORIA MUNDI

MARGO KOSTER

GOLDEN SALMON

THE FAIRY

Climbers

AMERICAN PILLAR

PAUL'S SCARLET

DR. VAN FLEET

MRS. ARTHUR CURTIS JAMES

Shrub Roses

FRAU KARL DRUSCHKI

GENERAL JACQUEMINOT

HENRY NEVARD

PINK GROOTENDORST

RED GROOTENDORST

Floribundas

Older:

DONALD PRIOR

ELSE POULSEN

SALMON SPRAY

DAGMAR SPATH

WORLD'S FAIR

Newer:

FLORADORA

GOLDILOCKS

CARROUSEL

PINOCCHIO

VOGUE

Species Roses

Rosa moyesi

Rosa pomifera

Rosa rubrifolia

Rosa omeiensis

Rosa hugonis

TREES AND SHRUBS FOR SPECIAL USES

*A selected list of deciduous ornamental woody plants, classified according to the conditions under which they are most useful and the places in which they are most suitable**

L. C. Chadwick

HOMEOWNERS and landscape gardeners should be more cognizant of the advisability of eliminating from their plantings many inferior types of deciduous and evergreen plants. It is far better to replace old, overgrown, unattractive shrubs and evergreens than to try to re-

vitalize them by extensive pruning. Severe pruning may be practiced, but from one to three years or more will elapse before some plants become really effective again in the landscape picture. Many excellent plants are now available for landscape planting. The old overgrown ones should be replaced with some of these better vines, shrubs, and trees.

The following plants are recommended. Modifications and substitutions may be made as new and better plants become available in the nurseries, or where regional requirements demand the use of hardier or more adaptable types.

Foundation Planting

BELOW MEDIUM-HIGH PORCHES OR
WINDOWS—4 TO 5 FEET

- glossy abelia (*Abelia grandiflora*)
- torch azalea (*Rhododendron obtusum kaempferi*)
- Chinese azalea (*Rhododendron molle*)
- cranberry cotoneaster (*Cotoneaster apiculata*)
- oak-leaf hydrangea (*Hydrangea quercifolia*)
- mountain currant (*Ribes alpinum*)
- garland spirea (*Spiraea arguta*)
- Korean spice viburnum, or fragrant viburnum (*Viburnum carlesii*)



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Garland spirea (*Spiraea arguta*).

*Many of the plants listed here are described and illustrated in previous issues of PLANTS & GARDENS, particularly the spring issues of 1945 (out of print), 1946, 1950, and 1951.—Ed.

BELow LOW PORCHES OR WINDOWS—
3 FEET OR LESS

- Japanese barberry (*Berberis thunbergii compacta*)
creeping cotoneaster (*Cotoneaster adpressa*)
flowering quince (*Chaenomeles superba*)
Kalm St. Johnswort (*Hypericum kalmianum*)
Henry St. Johnswort (*Hypericum patulum henryi*)
dwarf European cranberry-bush (*Viburnum opulus nanum*)

Border Planting

SCREEN PLANTING—10 TO 25 FEET—
TOLERATING CITY CONDITIONS

- cornelian-cherry (*Cornus mas*)
Washington thorn (*Crataegus phaeopurpurea*)
European spindle-tree (*Euonymus europaeus*)
common privet (*Ligustrum vulgare*)
Dahurian buckthorn (*Rhamnus davurica*)
Chinese lilac (*Syringa chinensis*)
wayfaring-tree (*Viburnum lantana*)

SCREEN PLANTING, HIGH HEDGES—
SHEARED OR UNSHEARED—
6 TO 9 OR 10 FEET

- gray dogwood (*Cornus racemosa*)
blood-twig dogwood (*Cornus sanguinea*)
winter honeysuckle (*Lonicera fragrantissima*)
arrow-wood (*Viburnum dentatum*)
Canby viburnum (*V. pubescens canbyi*)

HEDGES—LOW, MOSTLY SHEARED—
2 FEET OR LESS IF SHEARED

- Mentor barberry (*Berberis mentorensis*)
Japanese barberry (*Berberis thunbergii compacta*)—sheared or unsheared
cranberry cotoneaster (*Cotoneaster apiculata*)
flowering quince (*Chaenomeles superba*)
dwarf winged spindle-tree (*Euonymus alatus compactus*)
Regels privet (*Ligustrum obtusifolium regelianum*)
Ibolium privet (*Ligustrum ibolium*)—
over 10 feet if unsheared
mountain currant (*Ribes alpinum*)

dwarf European cranberry-bush (*Viburnum opulus nanum*)—sheared or not

**Shrubs and Small Trees
Tolerating City Conditions**

(In addition to those listed under
"Border Planting")

- Japanese quince (*Chaenomeles lagunaria*)
showy golden-bells (*Forsythia intermedia spectabilis*)
Ibolium privet (*Ligustrum ibolium*)
Regels privet (*Ligustrum obtusifolium regelianum*)
winter honeysuckle (*Lonicera fragrantissima*)
crab apples (*Malus*) Asiatic species
common lilac (*Syringa vulgaris*)
Canby viburnum (*Viburnum pubescens canbyi*)
Japanese snowball (*Viburnum tomentosum sterile*)



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Canby viburnum (*Viburnum pubescens canbyi*).



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Maidenhair-tree (*Ginkgo biloba*).

Trees Tolerating City Conditions

- Norway maple (*Acer platanoides*)
- maidenhair-tree (*Ginkgo biloba*)
- thornless honey-locust (*Gleditsia triacanthos inermis*)
- Amur cork-tree (*Phellodendron amurense*)
- London plane-tree (*Platanus acerifolia*)
- red oak (*Quercus borealis maxima*)
- shingle oak (*Quercus imbricaria*)
- Japanese pagoda-tree (*Sophora japonica*)
- English elm (*Ulmus procera*)
- Japanese zelkova (*Zelkova serrata*)

Shrubs Tolerating Shade and Dry Soil

- Siebold aralia (*Acanthopanax sieboldianus*)
- gray dogwood (*Cornus racemosa*)
- dwarf Illinois ninebark (*Physocarpus intermedius parvifolius*)
- Dahurian buckthorn (*Rhamnus davurica*)
- jetbead (*Rhodotypos tetrapetala*, or *kerrioides*)
- mountain currant (*Ribes alpinum*)



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Jetbead (*Rhodotypos tetrapetala*).

Shrubs Tolerating Shade and Normal Soil Conditions

(In addition to the preceding and the following group)

- glossy abelia (*Abelia grandiflora*)
- service-berry or shadbush (*Amelanchier laevis*)
- pagoda dogwood (*Cornus alternifolia*)
- cornelian-cherry (*Cornus mas*)
- winged spindle-tree (*Euonymus alatus*)
- European spindle-tree (*E. europaeus*)
- vernal witch-hazel (*Hamamelis vernalis*)
- common witch-hazel (*H. virginiana*)
- Regels privet (*Ligustrum obtusifolium regelianum*)
- Ibolium privet (*Ligustrum ibolium*)
- common privet (*Ligustrum vulgare*)
- winter honeysuckle (*Lonicera fragrantissima*)
- wayfaring-tree (*Viburnum lantana*)
- black-haw (*Viburnum prunifolium*)
- double-file viburnum (*V. tomentosum*)
- cranberry-bush (*Viburnum trilobum*)

Shrubs Tolerating Shade and Wet Soil

- bottlebrush buckeye (*Aesculus parviflora*)
- sweet pepperbush or summer sweet (*Clethra alnifolia*)
- Siberian dogwood (*Cornus alba sibirica*)
- spice-bush (*Lindera benzoin*)
- winterberry (*Ilex verticillata*)
- withe-rod (*Viburnum cassinoides*)

Shrubs Tolerating Wet Soil But Not Shade

- hazel alder (*Alnus rugosa*)
- red chokeberry (*Aronia arbutifolia*)
- strawberry-bush (*Euonymus americanus*)
- sweet-bay (*Magnolia virginiana*)
- purple osier (*Salix purpurea*)

Shrubs Tolerating Sandy Soils

- Siebold aralia (*Acanthopanax sieboldianus*)
- Japanese quince (*Chaenomeles lagenaria*)
- sweet-fern (*Comptonia peregrina*)
- cornelian-cherry (*Cornus mas*)
- gray dogwood (*Cornus racemosa*)
- blood-twig dogwood (*Cornus sanguinea*)

southern bush-honeysuckle (*Dicrilla sessilifolia*)

shrubby St. Johnswort (*Hypericum prolificum*)

common privet (*Ligustrum vulgare*)

bayberry (*Myrica pensylvanica*)

shrubby cinquefoil (*Potentilla fruticosa*)

alder buckthorn (*Rhamnus frangula*)

fragrant sumac (*Rhus aromatica*)

arrow-wood (*Viburnum dentatum*)

Spreading Plants to Cover Banks and Rough Places

Siebold aralia (*Acanthopanax sieboldianus*)

five-leaf akebia (*Akebia quinata*)

Siberian dogwood (*Cornus alba sibirica*)

weeping golden-bells (*Forsythia suspensa*)

Halls Japanese honeysuckle (*Lonicera japonica halliana*)

bayberry (*Myrica pensylvanica*)

Virginia creeper (*Parthenocissus quinquefolia*)

shrubby cinquefoil (*Potentilla fruticosa*)

fragrant sumac (*Rhus aromatica*)

Indian-currant (*Symphoricarpos orbiculatus*)



Bottlebrush buckeye (*Aesculus parviflora*).

EVERGREEN GROUND COVERS

Nine of the best for year-round effectiveness

L. C. Chadwick

Baltic English ivy (*Hedera helix* BALSTIC)
Wilson English ivy (*H. helix* WILSON)
Aarons-beard (*Hypericum calycinum*)
Canby pachistima (*Pachistima canbyi*)
Japanese spurge (*Pachysandra terminalis*)

Bowles periwinkle (*Vinca minor* BOWLES)
bearberry cotoneaster (*Cotoneaster dammeri*)
wintercreeper (*Euonymus fortunei*)
purple-leaf wintercreeper (*Euonymus fortunei* coloratus)



Japanese spurge (*Pachysandra terminalis*).

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HOW TO MAKE THE BEST USE OF EVERGREENS

Which ones to plant in various situations, and how to care for them

L. L. Kumlien

THE use of evergreens, properly called conifers, has come a long way in the past twenty to thirty years. Styles in architecture of dwellings have changed considerably. While there are almost no actually new evergreens, changes have taken place because certain types are used in increased numbers and others are all but forgotten.

The great majority of new homes are built on city and suburban lots, and fewer on acreages. This has called for less use of the larger forms of evergreens, such as firs, spruces, and pines, and a great increase in the use of plants of smaller stature, suitable for foundation and entrance plantings and confined areas in small gardens.

In the middle-western section of our country approximately half of all evergreens now planted are *yews*. These come in upright, semi-upright, and spreading forms. Next in importance are the *junipers*, and finally the *arbor-vitaes* and a very few others. This relative importance (or perhaps it would be more accurate to say relative popularity) prevails in about the same proportion in the northeastern part of the United States. In the somewhat less rigorous climate of certain parts of the northeastern states, some additional evergreens are also used extensively, especially *Chamaecyparis* varieties and hemlock, and these are frequently interplanted with some of the broad-leaved evergreens.

Homeowners who would not think of using old threadbare rugs or faded wall paper, sometimes do not realize that



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Where there is adequate lawn space, a hemlock (*Tsuga canadensis*) or a group of hemlocks can make a graceful evergreen planting.

plantings around the house also wear out. Evergreens, especially in foundation plantings, have a limited period of usefulness and then need to be replaced. Except in rare instances, even with care and pruning most evergreens retain their attractive form for a dozen years or less. When plantings are made with the idea that they are part of the home decoration (the same as paint and furnishings) and therefore subject to deterioration, the selection of varieties can be greatly increased, and some can be used that would otherwise be discarded because of too large ultimate growth.

Yews

Not many years ago there were only about three kinds of yew.

The **upright Japanese yew** (*Taxus capitata* or *T. cuspidata capitata*) is the typical form of the tree native to the Orient. It is best grown from seedlings trained to a single stem. When grown from cuttings, as it frequently is, it has a bad tendency to grow with multiple stems. Trees vary a great deal in appearance, depending on how they have been pruned in the nursery. This tree should be allowed to grow in a natural pyramid form, not more than half as wide as tall.

While the yews are the best of all evergreens for shady and semishady places, they can also be used in the sun.

The **spreading Japanese yew** (*Taxus cuspidata*) is the second yew of long use in plantings. There is wide variation among plants sold under this name. Some years ago I made a trip through forty-five nurseries in the eastern states to gather information on yews. There were thirty-three different kinds either being grown or in process of development, which could all be called "spreading yew." It will be seen therefore that form is more important than name in choosing spreading yews. When possible, it is most satisfactory to see the plants, to determine if they are actually spreading in form—that is, growing much wider than tall.

The old **dwarf Japanese yew**, usually called *T. cuspidata nana* or *brevifolia*, is

the third yew of long standing. This is still being grown and is a good one, chiefly as a slow-growing and low-growing type.

Now there is a new category of yews, generally columnar in form. These yews grow straight up, with numerous stems, some with a vase form.

Hicks yew and **Hatfield yew** (*T. media Hicksi* and *hatfieldi*) belong in this group.

Browns yew (*T. media brownii*) and the **intermedia yew** are half-way between upright and spreading and have great usefulness in one-story home plantings.

Junipers

The junipers are among the most satisfactory plants for foundation plantings.

Canaert juniper (*Juniperus virginiana canaerti*) and **Dundee juniper** (*J. virginiana pyramidiformis billii*) in time grow rather large, but they may be kept down by pruning for several years.

Pfitzer juniper (*J. chinensis pfitzeriana*), the low-growing, vigorous, popular spreading evergreen, is much better known. Staking up the center branch makes it develop into a semi-upright form and thereby increases the number of uses to which it may be put.

Hetz juniper, another variety of *J. chinensis*, a bluish green rapid spreader of great merit, is a newcomer but is now generally available in nurseries.

Arbor-vitaes

The arbor-vitaes are now much less in use than in former years.

The **pyramidal arbor-vitae** (*Thuja occidentalis pyramidalis*), the **globe arbor-vitae** (*T. o. woodwardi*), and the **Siberian** (or **ware**) **arbor-vitae** (*T. o. wareana*) account for most of the plantings of this kind of evergreen now. The last-named variety has been revived somewhat recently because it harmonizes with low ranch-type houses. The ware arbor-vitae can easily be trained to develop in a broad pyramidal form, somewhat the shape of a beehive. All of the arbor-vitaes are of short life in the shade but do well in sunny locations.

For Screens and Hedges

While evergreens are more widely used in foundation plantings than elsewhere in home gardens, there are other uses. For screens and borders along lot lines and for shutting off unwanted vistas, we can turn to the tree-like forms.

Douglas-fir, (*Pseudotsuga taxifolia*) is my favorite. Among the large-growing trees it is best able to stand crowding and severe pruning, as well as some shade.

Red pine, or **Norway pine**, as it is sometimes called (*Pinus resinosa*), is outstanding among the pines.

Spruces often have a tendency to thin out and suffer attacks from insects; I think the old **Norway spruce** (*Picea abies*) is still the best in this group. It develops a symmetrical form, grows rapidly, and makes a dense growth.

For evergreen hedges, we must choose trees of dainty foliage and small twigs that may be readily trimmed.

American arbor-vitae, (*Thuja occidentalis*) is the oldest evergreen hedge, used for a hundred years all over the Middle West and East.

Hemlock (*Tsuga*) and **yew** are excellent hedge plants, particularly where any part of the hedge is in shade.

Notes on Culture

Starvation and **drought** are often mistaken for disease by inexperienced planters. When one sees a healthy thrifty

planting, it is quite certain that the owner has fed his plants once or twice a year, has kept the ground cultivated around them, has kept them well watered, and has once in a while sprayed them thoroughly with a stiff stream of water.

Feeding, watering, and sanitation will eliminate many of the pests that otherwise infest evergreens. In the rare instances where these plants are in need of spraying for insects or disease, it is best to consult a nurseryman or tree man. One should not depend on the advice of some well-meaning neighbor, unless one knows him to be a person of abundant experience. **Spraying** was at one time a great ordeal, requiring measuring and weighing and mixing many ingredients. Great strides have been made by the chemical companies, and there is a handy package available for any dusting or spraying.

Treat your evergreens as well as you would your favorite dog. You wouldn't expect him to be happy eating out of garbage cans, drinking out of mud puddles, or fighting fleas. Evergreens are living plants; they grow, they brave the elements, and they return a full measure of beauty to you and to all who pass by the house. So far as possible, buy the plants in your own locality, listen to suggestions from the nurseryman, take care of the trees, and you will live in daily admiration of these most satisfying plants.

Foundation Plantings

dwarf Japanese yew
Pfitzer juniper

Hetz juniper

Hedges

Hatfield yew
hemlock

Accent Plants

hemlock
upright Japanese yew
spreading Japanese yew
Browns yew
Hicks yew
Canaert juniper

Screen Plantings

Douglas-fir	junipers
red pine	Dundee
hemlock	Canaert

HOW TO PLANT A TREE

Directions applicable to trees up to 5 inches in diameter

Time. Fall or early spring.

Preparation

Roots

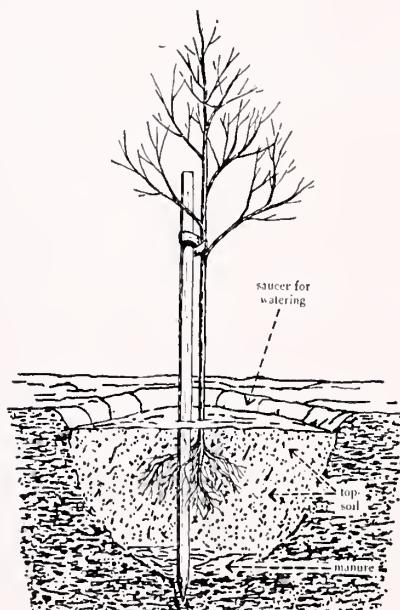
Do not allow to dry.

Soak in pail or tub of water if they seem dry when received.

Protect with moist burlap or cover with moist soil in a shallow trench (*heel in*) if unable to set plants out at once.

Cut off cleanly with pruning shears or knife, if broken or bruised.

Tops. Prune to compensate unavoidable loss of roots in digging up—to prevent excessive evaporation through leaves.



How to plant a young tree.

Remove

In general, about one fourth to one third of the secondary branches.

Entire branches—rather than clipping off ends of branches. Include among these

Branches that form tight or weak crotches.

Crowded or rubbing branches.

Do not cut main leader.

Hole (see diagrams below)

Twice as wide and deep as roots.

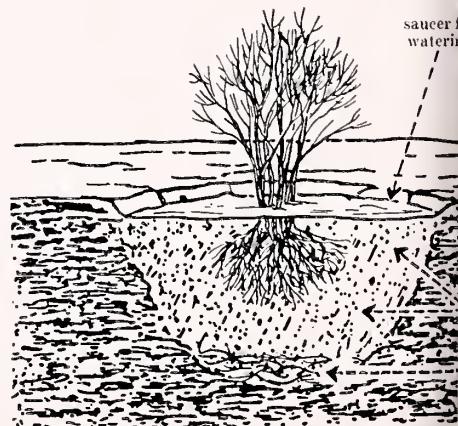
Several inches of manure mixed with soil in bottom of hole, and covered with several inches of soil.

Planting

Trees (see diagram below)

Drive stake near center of hole, well down into solid earth.

Set tree at same depth as before, or an inch or two deeper—not more. Place trunk vertical.



How to set out a shrub.

..... OR A SHRUB

.... or shrubs up to 5 feet tall

Shrubs (diagram on opposite page)

Set at same depth as before—no deeper.

Place branches so that whole plant is well balanced.

Trees and shrubs.

Spread roots out in hole.

Fill hole with good topsoil.

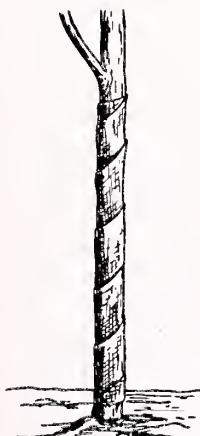
Pack soil as it is filled in.

Wash it into crevices among roots with gentle stream of water from hose.

Tramp it with the feet after roots are covered (see drawing below).

Make it so firm that plant cannot be pulled up.

Leave saucer-shaped depression around plant—2 inches deep—for catching rain water and for watering (diagrams opposite).



Trunk wrapped with burlap or paper.

Mulch ground over hole with strawy manure or salt hay, several inches deep, to prevent excessive evaporation.

Later Care.

Wrap trunks 2 inches or more in diameter with burlap or heavy paper, as shown. Leave on for two years, to protect trunk from sun scald and from attacks of insects.

Water plant adequately during first two years. In dry weather fill saucer-shaped depression with water three times, letting water soak in thoroughly before refilling.



Packing soil firmly over roots.

PRUNING

*When and how to prune shrubs and trees
to keep them healthy, vigorous, and beautiful**

Alfred C. Hottes

Reasons for Pruning

TO control shape. Some trees and shrubs need almost no pruning during their entire lifetime, but others tend to depart from the ideal shape for home planting; these can often be made the desired shape by pruning. Nevertheless, it is very difficult to make a plant grow to a horizontal form or to an informal arching form if its nature is to be upright; and rather than try to change the natural habit completely, one should obtain the proper kind of plant at the start. Persons often plant a treelike honeysuckle and then, when it grows nicely, ask the nurseryman how to prune it to a neat, compact, low shrub 3 feet tall.

In many gardens unlicensed plant

butchers, hired under the title of gardeners, prune all shrubs with hedge shears and trim them to globes, mops, and other unnatural shapes. There is a place for formal specimen shrubs in the landscape, and hedge shears are essential for hedges, for formal columns, and for globes; but it is a pity to see many of the lovely flowering shrubs so pruned that they bear neither a vestige of bloom nor any resemblance to their natural shape.

To rejuvenate. Many shrubs not only become unshapely with age but tend to cease blooming; and it is possible to bring them back to a youthful, vigorous, and blossoming condition by cutting them back to short stubs, or even to the ground, as shown in the photograph at the left.

It is highly desirable to cut down certain shrubs almost every spring in order to retain their graceful habit. This is especially true of butterfly-bush (*Buddleia*) and bluebeard (*Caryopteris*). In mild climates it is almost essential to cut back oleanders (*Nerium*) every five to ten years to retain their beauty. The same is true of forsythia, inkberry (*Ilex glabra*), and many other shrubs of temperate climates.

To check growth. When a plant grows too vigorously, removing a quantity of its leaves will stunt its growth. This is best done in the summer, when growth is less active than in the spring. Such pruning is most obvious in its effect on



1, an old specimen of mountain-laurel (*Kalmia latifolia*), which has outgrown its usefulness as an ornamental shrub. To rejuvenate, cut to ground, as in 2. 3, growing up first season after being cut down.

*More details on pruning may be found in PLANTS & GARDENS, Summer, 1952.—ED.

wisteria vines. If a great many of the very vigorous, long tapering shoots are cut to stubs, the plants are often stunted and thrown into the production of flower buds for the next year.

Shrubs can be kept compact and low by an occasional pruning of the roots. A spade is thrust into the soil so as to cut some of the roots, but not the principal ones—never taproots.

When to Prune

Spring-flowering shrubs and trees. In cold climates there is a clear-cut distinction between the spring-flowering trees and shrubs and those that bloom later in the year. In such plants as spring-flowering peaches, flowering quince (*Chaenomeles*), pussy willow, azaleas, and dogwood (*Cornus*), the flower buds have been formed the previous summer and remain dormant through the winter. It would, therefore, be a mistake to prune these plants in the winter or spring because all the flower buds for the year would be removed. Spring-flowering shrubs should be pruned as soon after blooming as possible.

Summer-flowering shrubs. In the summer-flowering hardy shrubs the flower buds are produced early in the season on the new twigs that develop in the spring; the buds blossom out in the same growing season in which they are formed. Such shrubs include hydrangeas, roses, and butterfly-bush (*Buddleia*). These shrubs may safely be pruned any time in the winter or early spring.

Mild-climate shrubs. Many of the shrubs grown in California and on the Gulf Coast bloom whenever the rainy season awakens them from their long period of dormancy due to drought. They bloom almost constantly if they are given abundant water and proper pruning. Most of them are evergreen, whereas the majority of hardy shrubs are deciduous. The pruning of these mild-climate shrubs should not be a one-season operation. As soon as the plants become a little unsightly from producing an abundant crop of bloom, the faded blossoms and developing seed pods should be removed. In



Forsythia. *Above*, in need of pruning. All older branches of large diameter should be removed, i.e., cut back to ground. *Below, left*, properly pruned, with numerous graceful branches that will flower heavily. *Right*, improper pruning has destroyed graceful form and good blooming qualities.



this way the plants are prepared for another period of beauty while they are still in active growth.

Berried shrubs, such as cotoneasters, firethorns (*Pyracantha*) and viburnums, must not be pruned heavily after blooming if an abundant display of fruits is desired. It is better to prune the shrubs a little after they have produced the berry display, but not so severely that they grow very vigorously. Too vigorous vegetative growth prevents the production of an abundant supply of flower buds for the following year. Gathering the berries freely for indoor decoration can serve as a method of pruning.



Lilac (*Syringa*). *Left*, overgrown specimen in need of *rejuvenation* pruning. When old branches are cut down, new growth is stimulated, as at *right*. *Right*, a well pruned plant: some young branches were left, and new growth has come out on old branches cut back.

How to Prune

Tools. Good pruning shears must be sharp enough to cut without crushing. A wide carpenter saw is poorly adapted to pruning. A narrow pruning saw avoids injury to the surrounding branches.

The reasons for pruning must be carefully considered before any cutting is done.

Any dead wood the plant may have should be removed first, for the health of the plant and for its appearance. It is the nature of a shrub to have some branches constantly dying without the work of any pest or disease; but if the plant is an ornamental pear, a cotoneaster, a fire-thorn (*Pyracantha*), or anything else that is related to the apples, the dead wood may be due to fire blight. In this case, the pruning tool should be sterilized after each cut. Corrosive sublimate solution may be used, but it must be handled carefully and kept away from children and pets, as it is a deadly poison. The cut should be made well below the dead wood, as the infection is sure to have spread a little farther than it shows.

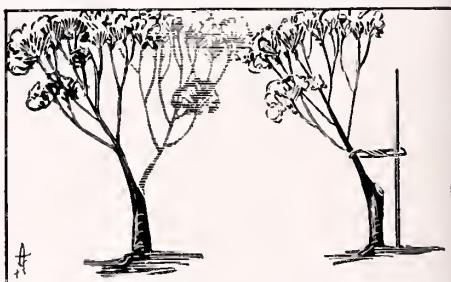
Branches that interfere with each other

or cross each other should be removed next. This also is both for health and for looks.

Branches that grow too strongly may need to have their growth curbed to improve the shape of the plant. Others may have to be removed to let in light, so that the rest of the branches may grow properly. A few of the oldest branches on a shrub should be cut almost to the ground each year, even though they seem strong and vigorous, as shown at the left. This is a sort of rejuvenation on the installment plan.

Shrubs with graceful arching branches, such as weigelas and spireas. In pruning these, one must not merely remove the old flowers from the tips of the branches, but must cut off about two thirds of the length of the branches. This helps to keep the shrub open and natural-looking.

A tree should not be allowed to divide into two main branches of equal size. Such branches are likely to cause the tree to split. One of them should be removed early in the life of the tree, and the other gradually trained to a vertical position, as illustrated below. In any case, opposite branches of equal size should be avoided, and pruning should be done in such a



Training one of two equal branches of a tree to be the main trunk.

way as to dispose the limbs around the trunk at various heights to form a well balanced head.

Cuts made a short distance above a bud heal best. It is particularly important to be careful about this in such shrubs as roses, where the buds may be far apart. Long stubs above buds die

back and encourage the entrance of borers and disease.

Just above an outside bud is generally the best place to cut. The uppermost bud on any branch is the one most likely to grow. Cutting to an outside bud discourages formation of interfering branches.

Lawn specimens. The charm of many a lawn tree depends upon having branches down to the ground. These low branches also hide the unsightliness of a grassless area under the tree. It is seldom that new branches are formed on the trunk below those already present; therefore if low branches are desired, they must be retained in the early life of the tree.

Fruit trees. Pruning young, newly set fruit trees very heavily delays the time of fruiting. It is advisable, however, to choose four or five branches to be the framework of the tree, and cut off the rest. The selected branches must arise spirally around the leader so that the top is eventually well balanced. On low-headed trees fruit is easier to gather and to spray. High-headed trees are easier to get under with lawn mowers and garden furniture.

A large branch must not be cut off with a stub remaining. Long stubs of



Barberry (*Berberis*). *Left*, neglected; *right*, properly pruned.

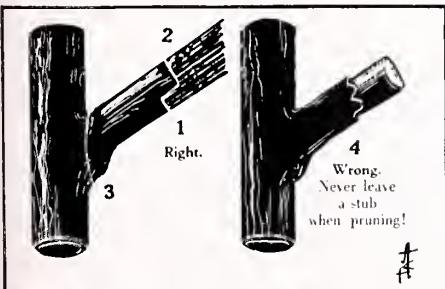
In removing a large branch the final cut must be made parallel to the trunk or main branch from which it arises; this cut is usually larger than if a stub were left, but it will heal.

Most of the length (and weight) of the branch should be removed by two preliminary cuts: the first one from the under side, the second from above and a little farther out, as shown in the diagram at the left; this helps to avoid the tearing of a large area of the bark when the branch falls.

Healing Wounds

Wounds an inch or less in diameter generally heal without any treatment if they have been made cleanly with sharp tools; but it is wise to cover most wounds with a protective material, such as emulsified asphalt, sold as tree paint under various trade names. Shellac may also be used. Ordinary paint slows the healing rather than hastening it. It is more important to protect the wound on a tree of low vitality. On a strong tree, healing may take place without much care.

Wounds heal slowly on the hard-wooded trees and shrubs, and on those difficult to transplant. These plants should have only such pruning as is absolutely necessary.



How to remove a large branch. Make cuts at 1 and 2 first, to prevent skinning the bark down the tree. Make the final cut, 3, nearly parallel to the trunk, so that a stub, 4, is not left.

large branches never heal; they are potential areas for the entrance of disease-producing organisms. They generally rot and hasten the death of the tree.

Summer Training

Pruning with the fingernail in the early stages of growth is often better than letting the strength of the tree or shrub be wasted in the production of growth in a direction not wanted. As soon as one sees the symmetry of a bush being destroyed by an extra-strong shoot at the side or top, he should curb that branch by breaking off its tip, as illustrated by the drawing on the next page.

A good leader is important on some trees, as the center of the tree from which the branches radiate. It is not uncommon for some side branch to be far more vigorous than the leader; in such a case, one may tie the strong branch to a stout

stake or section of pipe and train it to a vertical position.

Dead flowers should be cut off before the strength of the plant is wasted in forming seed pods, which are often unsightly anyway. The plants can often be kept in bloom by this simple precaution.

Many of the most desirable trees and shrubs need summer trimming to keep them neat and compact—not with hedge shears, perhaps not with pruning shears—often only with the fingers.

When a shrub or tree fails to develop a well balanced form, or when an unsightly bare spot appears in a hedge, it is generally possible to train branches so as to correct the defect by tying them into desired positions.

Reasons for Pruning

To control shape—but don't shape everything alike.

To rejuvenate—little by little or all at once.

To check growth—by cutting tops or roots.

Time for Pruning

Spring-flowering shrubs after blooming.

Summer-flowering hardy shrubs in winter or spring.

Mild-climate shrubs after flowering, while in active growth.

Berried shrubs after berries form—moderately.

Methods of Pruning

What to Remove

Dead wood.

Crossing branches.

Extra-strong branches.

Branches shading others.

A few old branches—to the ground.

One of two equal opposite branches.

All branches of young fruit trees
except those needed for framework.

No low branches on young tree
if low branches are desired
on full-grown tree.

How to Cut

Use sharp tools.

Cut

Arching branches
right amount to keep graceful
shape.

A small branch
just above an outside bud.

A large branch
with three properly spaced cuts.

Summer Training

Nip undesired growth early.

Tie branches in place while soft.

Cut off dead flowers.

Protect Wounds

When large

When on weak plants



Breaking off the tip of a branch (pinching it), as shown *above*, stimulates the growth of more branches, as shown at the *right*, and prevents the plant from growing too tall.



Pruning calls for pruning shears or a pruning saw.

Shearing, as may be done to a hedge, requires clipping shears.

All shrubs need some pruning.

Few shrubs ever need shearing.

TREE TROUBLES

Tall trees are not easy for the home gardener to take care of if they become diseased or infested with insects; it may be necessary to employ a pest control man with power sprayers. A few weeks of insect attack must not be allowed to ruin a valuable and beautiful tree. The homeowner who cannot take care of it himself should hire a tree expert.

On **small ornamentals** and **fruit trees** minor troubles can be treated by the home gardener. Every tree should be sprayed each year to control scale. A dormant oil spray (under trade names such as Seale-o and Sealecide) is used in the winter or early spring before the leaves begin to appear—not later than March or April. Another dormant spray is lime-sulfur at $1\frac{1}{2}$ cups of liquid concentrate to a gallon of water plus two teaspoonsfuls of nicotine sulfate (Black Leaf 40).

The various chewing worms can be controlled with an arsenate of lead spray in the spring. The dates for this depend on the pests to be fought.

Canker worm control requires an early spraying, when the leaves on oaks, elms, birches, and fruit trees are half out. The arsenate of lead is mixed at one heaping teaspoonful to a gallon of water. On smooth leaves the spray can be made to stick by adding an equal amount of flour to the dry lead arsenate. DDT may also be used but it allows mites to increase.

Elm leaf beetle and the **codling moth** on apples may need attention a little later. DDT or arsenate of lead will control them.

No one spray can be a panacea; and the home gardener may need the advice of a nurseryman.



LAWNS

How to care for an established lawn or make a new one

Established Lawn

Fertilizing

Time: twice a year.

Early spring after ground has thawed. Spring rains will wash fertilizer into soil, and lawn will get a good start for the season.

Early fall (September). This feeding will promote good growth during the moist cool weather of autumn.

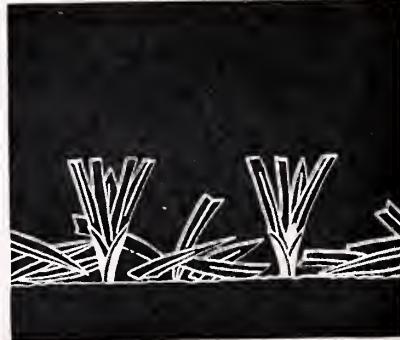
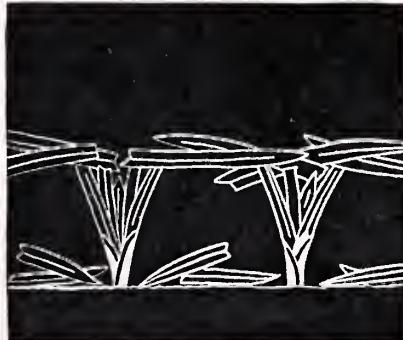
Material: complete fertilizer, 5-10-5, 4-12-4, or 8-6-2 (nitrogen-phosphorus-potassium), for most areas in temperate climates. (Vigoro or Scott's Turf Builder is adequate for most soils.)

Amount: 20 pounds for 1000 square feet in spring, half as much in fall.

Application. Spread half north and south, half east and west; or use a small mechanical spreader.

Lawn should be mowed before grass grows too tall. *Left*, too late. *Right*, at correct time.

Drawings courtesy of The Home Garden





Raking seed in lightly and evenly with back of rake (page 62).



Courtesy of The Home Garden
Lawn roller.

Test rate of penetration by taking small plug out of the lawn with a knife, after watering has continued for an hour or so.

Light sprinkling does harm rather than good—encourages roots to stay near the surface, where they are quickly damaged by heat and dryness between sprinklings.

Repairing bare spots

Time: early September.

Method

Brush out dead grass with coarse broom or bamboo rake.

Cultivate soil (spade under) 6-8 inches deep.

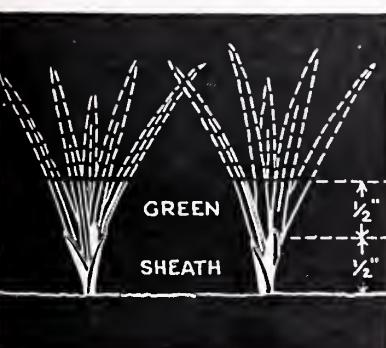
Rake in a little fertilizer.

Sow seed—not too thickly.

Tamp resеeded area with board or back of iron rake.

Weeds. Don't let them get the upper hand.

Most lawns should be mowed at $1\frac{1}{2}$ inches (page 60). *Left, cut too short. Right, cut at proper height.*



Dig them out by hand.

Chemical weed killers should be used only by *experienced gardeners* or by those who will follow directions with utmost care (PLANTS & GARDENS, Spring, 1952, page 42).

Pests: Japanese beetle grubs and chinch bugs often cause brown patches.

Chlordane and DDT (wettable powders) heavily watered in at once, will control these pests.

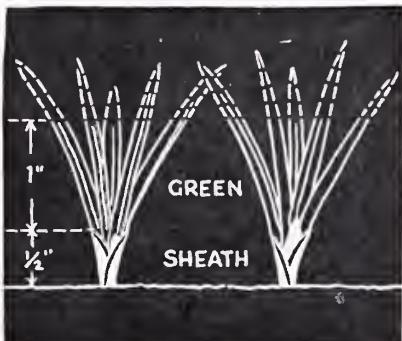
Aerification

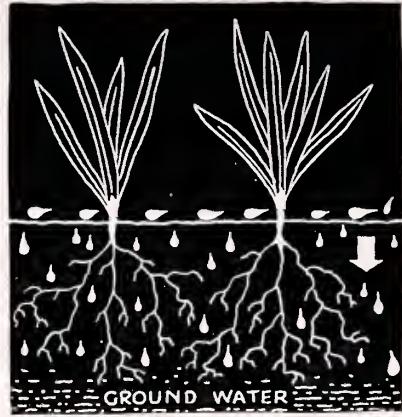
Where needed: in much-trampled places, especially if there are brown spots or slow-growing areas.

Methods

Push garden fork into turf 4-6 inches deep every few inches; pull it back a little before pulling it out, to open small cavities; or—

Drawings courtesy of The Home Garden





Drawings courtesy of The Home Garden

Watering should be done thoroughly or not at all (page 60). *Left*, harmful effect of light sprinkling. *Right*, beneficial result of thorough soaking.

Buy aerifier on wheels (PLANTS & GARDENS, Winter, 1952, page 281).

Making a New Lawn

Time: early fall (see diagrams below).

Grading (if necessary)

Remove topsoil and put to one side.

Improve subsoil if topsoil was not 4-8 inches deep; best done by—

Adding peat moss, compost, or well-rotted manure, raked in thoroughly. Use 3 cubic yards of manure or 2 bales of peat moss for 1000 square feet.

Level subsoil.

Replace topsoil (4-8 inches if possible).

Roll the surface; if it is not even, rake and roll again.

Lime—if needed (see page 60).

Fertilizer at least two weeks later than liming, if lime was applied.

Prepare seed bed with rototiller if one is available—often to be rented from a hardware or garden supply store; or loosen surface with rake.

Seed

Ask a well-known seedsman what kind is suitable for the situation.

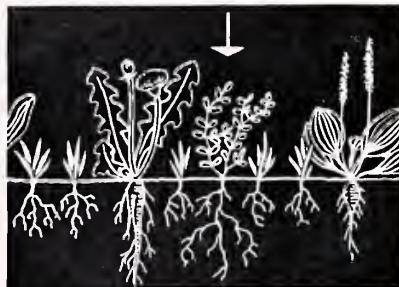
Buy best quality: cheap seed is poor economy.

Sow half north and south, half east and west, or use a mechanical seeder.

Rake seed in very lightly, till it is barely covered with soil (page 61).

Roll the surface again.

Fall is the best time to seed a lawn. *Left*, spring-sown grass has more competition with weeds, and has the drying effect of high sun (arrow). *Right*, fall-sown grass has less competition with weeds, and has a cooler and moister soil because of slanting sun (arrow).



GROWING PLANTS FROM SEEDS— NEWER IDEAS

*How to overcome some of the common difficulties
and get results more uniformly successful*

V. T. Stoutemyer

A good seed list or catalog is in a sense a magic carpet which readily brings the hard-won horticultural treasures of the world to the doorsteps of those who have mastered the techniques of seeding. British gardeners have been particularly successful in providing their gardens with an endless variety of interesting rare plants by taking advantage of the possibilities of plant introduction by seed.

Plant breeding depends largely on seedling variation; and horticulturists who have the time to engage in this pursuit, either on an amateur or on a professional basis, find it an absorbing activity.

The frequent high percentage of loss of seedlings by inexperienced growers would be surprising, in view of the universality of natural seed reproduction, unless the prodigality of the process in nature were recalled. Knowledge of a few basic principles of seed handling, together with adoption of a few reliable, proved procedures, is the requisite for success. One can also profit by a number of improvements in the handling of seeds which have recently been made.

Viability

Naturally short-lived seeds. One common reason for disappointment with seeds is that certain kinds are dead in a comparatively few months after they mature; they are nonviable when received, and no amount of skill on the grower's part could possibly bring them to life.



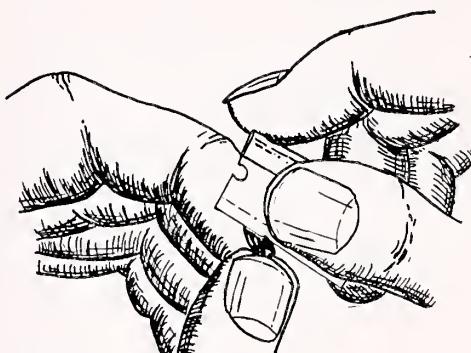
Author courtesy

Tomato seedlings raised to transplanting size in sphagnum without soil or fertilizer (page 66).

Storage conditions. Certain other kinds of seeds have a potential life of several to many years, which, however, may be greatly shortened under unfavorable storage conditions. High temperature, coupled with high air humidity and correspondingly high moisture content of seeds, shortens the life of seeds of many vegetables and annual or perennial flowering plants. Storage in a dry, cool place reduces the moisture content of such seeds and aids greatly in prolonging the period of viability. Storage

in sealed containers, after some dehydration of the seeds under refrigeration, often greatly prolongs the life of seeds.

Hard coats. The hard-coated seeds undoubtedly are the least affected by adverse environmental conditions. Many of the longest-lived seeds belong to this group. There are authentic records of such seeds remaining viable for the greater part of a century.* However, a hard seed coat often causes a serious difficulty in germination unless this covering is broken or rendered permeable to water and oxygen by scarification or by treatment with acids or hot water. Hard seed coats have doubtless been important in evolution — in enabling seeds of plants to survive under unfavorable conditions.



Nicking the seed coat with a razor blade speeds the germination of some kinds of hard-coated seeds. (Scarifying with a file has the same effect.)

Pelleted Seeds

The preparation of pelleted seeds in recent years is an interesting new development. Although such seeds are now easily available, their use has been of somewhat limited application to the amateur gardener. In this process, the seeds are individually coated with a suitable inert material that will absorb moisture from the soil when the seeds are planted. This material, usually a clay mineral, may be mixed with a fungi-

cide or a repellent against animal pests. Nutrient materials may also be incorporated in order to accelerate the growth of the seedling in the early stages. Sometimes dyes are used to indicate the flower color of the plant to be produced.

The cost of the processing of seeds of vegetable and flower crops in this manner is offset to some extent by the great reduction in waste during sowing, since the seeds are easily handled and can be accurately spaced. In certain large-scale plantings, some pelleted seeds can be put into the ground with great precision by mechanized drills since the treated seeds are uniform in size and shape.

Stratification

The investigations of the Boyce Thompson Institute have explained many details connected with the stratification of seeds of woody plants.* In this process the seeds are placed in contact with a moist medium and kept at a temperature a little above freezing for one to six months. Seeds of certain herbaceous plants are benefited by this treatment; with these seeds, dry storage at such temperatures for a few weeks often improves results.

Planting Medium

Soil. The use of ordinary garden soils for seeding is always fraught with some hazards unless the soil is sterilized by steaming or by fumigating and drenching with certain chemicals. In some areas nurserymen and florists are now selling sterilized seeding and potting soils to the public. Such soils should be very loose and porous, to provide the good aeration and drainage which favor the germination of most kinds of seeds.

Vermiculite. Although soils, properly used, will give as good results as any other seeding medium, it is difficult to equal the use of vermiculite for simplicity and for certainty of success. This heat-expanded mica, much used in the building trades, is available in grades

*PLANTS & GARDENS, Winter, 1951, pages 268-272.—ED.

*PLANTS & GARDENS, Summer, 1951, page 99.—ED.

suitable for horticultural purposes. Since the material is processed at high temperatures, it does not harbor injurious organisms. It has high moisture-holding capacity and does not require frequent watering. It is also adaptable to capillary watering, which entirely removes the need of attention to watering: seed pots or boxes placed in a shallow container of water will be watered automatically as long as the supply of water is maintained; there is no need of covering the top of the pot or container with a sheet of glass to prevent excessive surface evaporation. When using vermiculite, the sowing may be done in the manner usual for soil.

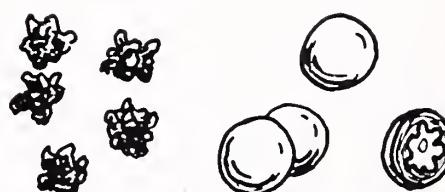
Vermiculite contains little in the way of nutrients for plants; and it is difficult to obtain seedlings of the size usually desired for transplanting unless a dilute solution of mineral nutrients is applied to the vermiculite at the time of seeding or shortly after the germination of the seeds, and at intervals as needed. Five teaspoonfuls of the ordinary, low-analysis garden fertilizer (such as 5-8-6 or 4-12-4) in a gallon of water is usually adequate. The fertilizer should stand in the water twelve to eighteen hours, for partial solution; and the mixture should be shaken or stirred before it is put on the vermiculite. Many excellent liquid fertilizers are now offered and are good if injurious concentrations are avoided. If care is taken to permit some of the vermiculite to adhere to the roots, transplanting to soil can be done with little checking of growth.

Sphagnum. Another method of seed germination, which was publicized by the author and associates some years ago, is the use of sphagnum moss (*PLANTS & GARDENS*, Winter, 1945, pages 227-229). This method has since been used widely, apparently with uniformly good results. Some have reported it to be an ideal method of handling certain difficult seeds. It is a little more complicated than the use of vermiculite and requires careful attention to important details.

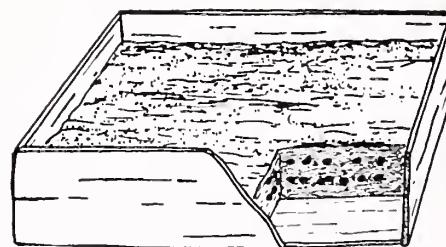
Sphagnum moss was once used for surgical dressings with much success,

and was a crude forerunner of the modern antibiotics. The commercial product from Wisconsin or New Jersey has given uniformly excellent results with seeds, but types collected on the Pacific Coast seem to be less desirable. Shredded sphagnum moss ready for use in seed germination can now be bought.

Those living near sphagnum bogs may use the living moss. Either this or the dried, baled product (obtainable at nurseries and seed stores) may be rubbed through a coarse screen having three meshes to the inch. A hammer mill is excellent for preparing large quantities.



Beet seeds. *Left*, natural; *right*, pelleted.



Stratification of seeds.

The pot or seed flat is filled with the material and firmed moderately to a smooth surface. Repeated watering should be given, preferably well in advance of seeding, and the material must never be allowed to dry. There is little danger of overwatering if drainage outlets are provided, and the greatest likelihood of failure is from inadequate or irregular watering.

The procedure with sphagnum is different from that permissible with vermiculite in several very important ways.

1. Subirrigation, or capillary water-

ing, should **not** be used with sphagnum.

2. The pots or flats of sphagnum should be covered with glass or plastic to prevent undue evaporation from the surface.

3. The use of a nutrient solution is far less important with sphagnum, although it will accelerate the growth of the seedlings. By withholding nutrients, it is possible to hold seedlings at a desired stage of growth for extended periods of time without injury.

Indoor Planting

In indoor seeding, fine seeds are often best left not covered by the planting medium if the surface of the seeding medium is kept uniformly moist. **Covering** the seed pan or flat with a pane of glass or a light wooden frame covered with plastic aids greatly in retaining moisture. It is also helpful to **shade** seed flats or pans with newspapers or cloth. Light is detrimental to the germination of some seeds but aids others. In the experience of the writer, the use of a reduced level of light in the early stages of germination seems to work well with virtually all kinds of seeds. After the **seedlings come up**, they should have as much light as they can stand, or they

will be weakened and spindling in growth (page 67).

Outdoor Planting

Frequent causes of failure in outdoor seeding are too deep planting, too thick planting, soil compaction, and damping off as the result of attacks by fungi. Some seedsmen are now providing packed seeds pretreated with fungicides, which often improve results.

Sometimes in outdoor seeding, a combination of conditions will lead to failure that is unavoidable. For this reason it is well, whenever the quantity of seed permits, to keep in reserve a portion for reseeding in case of necessity.

Temperature

One of the most important factors in the successful germination of all kinds of seeds, both indoors and in the open ground, is temperature. Some tropical seeds require much heat for best results. On the other hand, seeds of many alpine plants will not germinate unless the temperatures are comparatively low. Unfortunately, much of the best modern information on this subject is in foreign-language publications and has never been collected and made available in English.



Pan of seeds shaded with paper, and covered with glass to retain moisture.



Automatic watering by capillarity: pots of vermiculite set in pan of water (p. 65).



After the seedlings are up, the glass and paper are removed and the seedlings are given light at the window. Some of these have already been transplanted.

Grass

Some excellent results have been obtained with grass seeding without any preparation of the soil of the seedbed in a conventional manner. In this new system, the soil is passed over repeatedly, often as many as five or six times, by an instrument that perforates the turf with numerous holes $\frac{1}{2}$ inch or more in diameter. In recent years this treatment has become very popular as a means of improving the penetration of water, nutrients, and oxygen into turf, and usually results in a great improvement of the growth. Several different types of



Author courtesy

Seedlings grown in insufficient light immediately after germination are white, weak, and spindly, and will never make good plants.

apparatus have been devised for this treatment. The grass is seeded on the soil prepared in this manner, without any attempt to cover it. The seed is washed into the holes and germinates abundantly. Although one might expect unfavorable results from such a seemingly haphazard method of seeding, the secret of the frequently observed good results is probably the light provided to the seeds, together with favorable conditions of moisture and temperature.*

*PLANTS & GARDENS, Winter, 1952, page 281.—ED.

Store seeds dry, in cool, dry place.

Hard-coated seeds

File

Treat with acid

Treat with hot water

Stratification—for certain seeds

Pelleted seeds, coated with:

Moisture absorbers

Pesticides

Nutrients

Planting Medium

Sterilized soil

Vermiculite plus nutrients

Sphagnum

Indoor planting

Control light and moisture

Outdoor planting

Seeds pretreated with fungicides

Grass seedbed preparation

Perforation



WITHIN THE BROOKLYN BOTANIC GARDEN

A NEW FLOWERING CRAB APPLE

RED JADE is the name of the first new variety of tree to be introduced by the Brooklyn Botanic Garden. It is a weeping crab apple, covered with white blossoms in the spring, and bearing a heavy crop of small bright red fruits every fall. The fruits are the more conspicuous because the tree loses its leaves early; they brighten the garden well into November, when most other plants are drab and less interesting. This graceful and beautiful tree is hardy and will grow almost anywhere in temperate or severe climates.

The original RED JADE was produced as a seedling eighteen years ago by Dr.

George M. Reed of the Garden's scientific staff. Because of its rare and distinctive qualities, it was selected from thousands of seedlings that he raised for experimental purposes. It is now 13 feet tall and has a spread of 14 feet. This new variety has been propagated by budding and a thousand young trees have been raised; these are now only 3 years old and about 3 feet tall, but many of them have already flowered and borne fruit.

The Woman's Auxiliary of the Brooklyn Botanic Garden is in charge of the distribution of the young trees.



The Brooklyn Botanic Garden's new variety of weeping crab apple RED JADE bears fruit and develops its graceful drooping branches while still very young. The photograph above shows a 3-year-old specimen. Further details are given on the opposite page.

The Woman's Auxiliary of the Garden is accepting gifts to establish a fund for plant breeding and the development of new varieties of ornamental plants. Donors to the fund receive young specimens of the new tree. Anyone interested in obtaining one of these rare and beautiful trees may learn the exact conditions from Mrs. Leonard P. Moore, President of the Woman's Auxiliary, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn 25, New York.

TO REACH THE GARDEN

By Subway

B.M.T. (Brighton Beach line) downtown express or local to Prospect Park Station.

I.R.T., West Side (7th Avenue or Broadway-7th Avenue line) downtown express marked "New Lots Avenue" or "Flatbush Avenue," to Eastern Parkway-Brooklyn Museum Station.

I.R.T., East Side (Lexington Avenue line) downtown express marked "New Lots Avenue" or "Utica Avenue" or "Atlantic Avenue," to Nevins Street; step across platform and change to 7th Avenue or Broadway-7th Avenue train, ride to Eastern Parkway-Brooklyn Museum Station.

By Bus

Flatbush Avenue bus to Empire Boulevard

Lorimer Street bus }
Tompkins Avenue bus }

Union Street bus }
Vanderbilt Avenue bus }

By Automobile

From Long Island, take Eastern Parkway westward, and turn left at Washington Avenue.

From Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway; follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

SUMMER
1953

American Gardens

for
City
Town
Country

Gardens
of
Three
Centuries

NEW SERIES

NO. 2



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PLANTS & GARDENS

Adams needle (*Yucca filamentosa*)

Vol. 9

Summer, 1953

No. 2

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Cover: A garden in Colonial Williamsburg. *Courtesy Colonial Williamsburg.*

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Editorial

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Except where otherwise credited, photographs by LOUIS BUHLE

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SHOULD BE ADDRESSED TO:

BROOKLYN BOTANIC GARDEN, BROOKLYN 25, N. Y.



Roche phot

A background of shadows on the lawn emphasizes the towering spire of delphinium.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES
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1000 WASHINGTON AVENUE
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Summer 1953

About this handbook on American gardens:

Probably the commonest error of the amateur gardener and horticulturist is his failure to recognize the importance of garden design. He puts one plant here, another one there, and may have great affection for and knowledge of them as individuals. But when it comes to creating a three-dimensional picture with living plants, he "misses the boat."

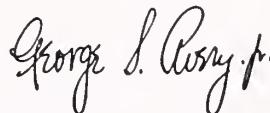
There is a real challenge in so designing a garden that its many separate components make a harmonious picture. Color, texture and form of plants are important; so is their ever-changing relationship. The fact that each plant grows usually faster or slower than its neighbor, complicates the thinking of the amateur — and frequently of professionals. Many a well-planned garden soon outgrows itself. Before such a situation becomes acute, certain plants ought to be moved out of the picture — but rarely are.

This little book on American gardens presents nearly 100 pictures that we hope will be a reservoir of ideas for every reader. Some of the pictures are chiefly of historic interest, to show the route by which gardens got to be the way they are just now. Other pictures will be helpful to those who are currently planning new gardens and doing over long existing ones.

The plain hard work that goes into an unplanned and nondescript garden might just as well go into a planned one. May these pages offer the inspiration. The picture to be created can start on its way with small plants, and if the design is good, it will gradually mature and grow into fulfillment.

It has been a pleasure to work on this project with Mary Deputy Lamson, Guest Editor, and the authors she has chosen. Mrs. Lamson's objective is not only to help clarify the importance of design in present-day gardens, but to tell the whole story — from gardens that overemphasized design and underemphasized plants, in the eighteenth century, to just the reverse in the nineteenth. The aim in the planning of contemporary gardens has come to include the idea of their being lived in. Outdoor rooms can be things of natural beauty; to create them is a challenge to every amateur gardener and horticulturist, wherever he may live.

Sincerely yours,



Director



Natalie H. Bowen, designer

Frederick W. Raetz photo

This luxuriant city garden depends on ivy (*Hedera*) and rhododendrons for year-round effect; to them are added seasonal plants like chrysanthemums, caladiums, and begonias, brought in in pots and lavishly used.

CITY GARDENS

*Their peculiar difficulties and how to overcome these
by careful planning and choice of plants*

Natalie Helene Bowen

A VISITOR to the city who has taken sight-seeing trips only along the streets and between solid walls of buildings, where there are only now and then a few public parks or street trees, should take a trip upward to look at the city from a high building. A real surprise is in store for him.

Between solid rows of houses he sees trees, shrubs, and small gardens; on roofs, terraces, and window sills there is plant life in abundance. In favorable weather he can see people sitting and working in their outdoor space and otherwise making

real use of it. The desire to have a bit of green, to grow plants and flowers, is strong enough to overcome the difficulties of growing plants in congested cities.

Characteristics

To greater or less extent the privileges and principles of city gardening are the same all over the country. However, the conditions for gardening in cities are very different from those prevailing in the suburbs or in the country, and the style of garden is different. With the worst of

conditions—air pollution, lack of sunshine, limited space, and worthless soil—it is still possible, by planning and care, to have an attractive back-yard or terrace garden. It is imperative that the gardener approach the problem with a special viewpoint.

A city garden is so much a part of the home itself that it cannot be shut away unseen at any time of the year. It must have a design that will be good throughout the year and make the garden always an extension of the interior. Moreover, a city garden is seen in its entirety at first glance; there cannot be concealed features, distant vistas, or surprises around the corner.

Most city gardens are meant for use as part-time rooms. Furniture, enclosures for privacy, and ornamentation are part of the picture and must harmonize in style and design. Too much fancy ironwork or statuary, no matter how beautiful in itself, has the same effect as too much brie-a-brac in a living room. Simple design (including structural features with and around plants in a practical design) is an essential principle.

Soil can be improved or replaced to suit such plants as will thrive under the most difficult conditions, but other factors cannot be changed. Depth of shade in average back yards, lack of air circulation in fence-in yards, brilliancy of sunlight and too much wind on terraces, ever increasing air pollution—each contributes to failure of plants in the city. All of these unfavorable conditions, if faced realistically, can be overcome by precautions of soil preparation and plant selection.

Soil

I have seldom found any soil in a city back yard that was worth saving. Occasionally, the top 2 to 4 inches could be screened and improved by addition of humus, manure, peat moss, and any other ingredients the plant material required. There was still the problem of deepening

the soil by bringing in good rich loam to replace builders' fill or subsoil. Excavation to the depth of a foot for ground covers or flower borders, and up to 3 feet for trees and deep-rooting shrubs has been proved a good investment. Wise city gardeners put effort and expense into this fundamental work. The city garden is the perfect example of the dollar shrub in a five-dollar hole. Deep soil preparation not only insures long life to trees, shrubs, and vines, but makes possible proper drainage and moisture retention, both of which are especially important in the city.

On terraces and roof gardens, where all soil must be carried up and placed in containers or built-up beds, the problem is that of a correct soil mixture as well as drainage. The better the soil with respect to humus and moisture-retaining peat moss or leaf mold, the less is the damaging drying and caking. In all types of city plantings, a year-round mulch is essential, particularly for ericaceous (heath-family) plants.

Water

Once the soil has been properly prepared and a mulch provided, watering must be properly done. Really deep watering when needed, instead of more frequent but inadequate sprinkling, is the only sound practice in city or country; but city gardens have an additional need of water—for the washing of foliage. City plants accumulate such a load of dust and soot that many of them die for no other reason than that. Washing foliage with a strong spray from the hose must be done as often as needed to keep leaves clean. In the early spring precious broad-leaved evergreens may be worth a scrubbing with clear water and a brush.

Plants

The choice of plant material is surprisingly wide, but many plants that grow easily in the country or less congested city neighborhoods are intolerant of ex-

treme city conditions; notable among these are lilacs, roses, many fine-needed evergreens, and most flowering annuals and perennials. Many plants will thrive for three or four years, then suddenly collapse.

Most broad-leaved evergreens rarely have a good show of bloom, although their foliage remains attractive. Kurume and snow azaleas (*Rhododendron obtusum amoenum* and *R. mucronatum*) are exceptions, and can be counted on for a display of color year after year.

Rhododendrons seldom bloom; *Pieris japonica* keeps in fine foliage but blooms sparsely; mountain-laurel (*Kalmia latifolia*) neither blooms nor thrives.

On the other hand, the many varieties of Japanese holly (*Ilex crenata*) do very well indeed. Since an evergreen look is one that every city gardener strives for, the basic selection must be made from such hardy shrubs to make a pleasing picture the year round. When more variety is desired, periodic replacements must be expected.

The evergreen illusion is helped by the use of hardy semi-evergreens and deciduous shrubs that keep their foliage late into the winter and leaf out early in the spring; privet (*Ligustrum*) leads the list, with English ivy (*Hedera helix*) for ground cover. Firethorn (*Pyracantha coccinea*) does very well indeed and should be used more than it is. The rarely seen hardy bamboo (*Pseudosasa japonica*) is one of the main winter attractions in my own garden; a real pest in the country, where it spreads too rapidly, it is highly desirable for difficult city spots.

Spring is the season of color in city gardens. Among the very hardy and reliable spring-flowering trees and shrubs are hawthorn (*Crataegus*), cherries, pears, and magnolias. Dogwood (*Cornus*) occasionally rewards a faithful gardener with a fine display of bloom, and forsythia, snowball (*Viburnum*), and weigela add their contribution of early color.

For late summer bloom nothing can surpass rose-of-Sharon (*Hibiscus syriacus*) in white, pink, or blue varieties.

Vines play a major part in city gardens, softening harsh architectural features and providing abundant greenery, as well as seasonal bloom. The rapidly growing silver lace-vine (*Polygonum auberti*) thrives without attention except for drastic pruning every spring and a few times during the summer; without pruning, it overgrows everything within reach. Once established, wisteria grows and blooms spectacularly. Given sunshine, the ever popular morning-glories (*Ipomoea*) bloom profusely. Boston-ivy (*Parthenocissus tricuspidata*) and Virginia creeper (*P. quinquefolia*), if sprayed against caterpillars, do much to camouflage unsightly masonry.

Annuals and tender plants. City gardeners should not try to raise annuals from seed; better results are obtained by buying potted plants from local florists. Geraniums, petunias, and lantanas provide summer-long color in sunny locations. Begonias and fuchsias tolerate a considerable amount of shade. Fancy-leaved caladiums can be counted on for brilliant color from May to October; being tropical, they enjoy the humid closeness of an average New York back yard.

Conclusion

In favorable spots many plants will succeed. Given a congested, air-polluted section with limited time for intensive gardening, a city gardener can achieve success by selecting plants with care rather than by casual experimenting. Far better to have a healthy, green, pleasant garden of privet, ivy, and wisteria than a garden of sickly or dead broad-leaved rhododendron and holly or feeble zinnias, roses, and lilacs.

Good design, carefully chosen plants, and meticulous garden housekeeping can make the smallest or the shadiest city garden a source of profound interest and satisfaction and a thing of beauty.



Frederick W. Raetz photo

This small city back yard uses silver lace-vine (*Polygonum auberti*), ivy (*Hedera*), and geraniums (*Pelargonium*) for the illusion of a garden.





Mary Deputy Lamson, L.A.

Richard Averill Smith photo

↑ High above New York's Fifth Avenue, this garden has a glass windbreak. From the paved terrace outside the living room, steps lead up to the garden. Soil 3 feet deep over the entire area makes it possible to grow flowering cherries (*Prunus*), lilacs (*Syringa*), irises, and peonies. Such a horticultural *tour de force* is possible only with the windbreak and with a building designed to carry the necessary weight and provide for the drainage.

Gardens in the East River section of New York take advantage of picturesque old trees and vistas in the neighboring gardens.

Frederick W. Raetz photo

← Vines used lavishly soften the walls and fence enclosing this small city garden and provide a fitting background for brilliant spring flowers.

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Gardens in Georgetown, near Washington, D. C. Each garden illustrates careful planning and planting of available space. In cities with less favorable conditions, the plans would still be excellent but might require different plant material.

DESIGNING GARDENS IN TOWNS AND VILLAGES

Ingenious ways of achieving the desired effect

THE small property, whether in the suburbs of a large city or in a country village, tests the skill of any designer. Usually the house takes up a large proportion of the property, and neighboring houses and garages are most intrusive. Practical matters such as drying yards, driveways, children's play spaces, and parking facilities must be taken care of without occupying too large a proportion of the total grounds, and must still seem to be an integral part of the whole design.

Streets and buildings to be screened (or at least made to seem more remote) require heavy plantings or fences and

walls difficult to attain on a small piece of land.

The primary necessity in planning the small property is to make one plant do three or four jobs at the same time. For example, the tall planting at the back of the property may serve as screen for a neighbor's house and garage, as background for a garden, and (if it is of fruit trees or bushes) as food-producing area, all at the same time. A specimen tree (or a pair of them) may mark the focal point or the entrance for a small garden beyond, and at the same time shade a terrace. The arrangement of each group of

This flower garden occupies one corner of a small property. Tulips and wild blue phlox (*P. divaricata*) accompany the bloom of lilacs (*Syringa*) and gnarled flowering plum trees.

Mary Deputy Lamson, L.A.

Richard Averill Smith photo





Walter and Florence Gerke, L.A.

Roy Wolfe photo

Skillful planning takes full advantage of differences in level, and dramatizes a fine existing tree.

planting must be considered from all directions; it must look well from every part of the place and from the windows of the house, and must be presentable at every time of the year.

The plant material on the small property must be carefully selected for proportion to the total size of the house and of the grounds, and for remaining in correct proportion as it matures. This usually means that the ground-consuming trees like beeches (*Fagus*), lindens (*Tilia*), Norway maples (*Acer platanoides*) have no place on the small property. If a shade tree is necessary, the higher-headed honey-locust (*Gleditsia triacanthos*), elm (*Ulmus*), and oak

(*Quercus*) are likely to be much more satisfactory. Flowering trees are often in much better proportion to the property as a whole than big shade trees. Among evergreens, the slender cedars (*Juniperus*) and arbor-vitae (*Thuja*) are less overwhelming than forest trees like pines, hemlocks (*Tsuga*), and spruces (*Picea*). Slow-growing or dwarf forms of familiar shrubs have particular appeal on the small place.

The quality of repose and spaciousness, necessary in any garden, must be achieved by the use of great restraint in selection and arrangement of every plant, and skillful relation of each part of the property to its neighbor and to the whole.



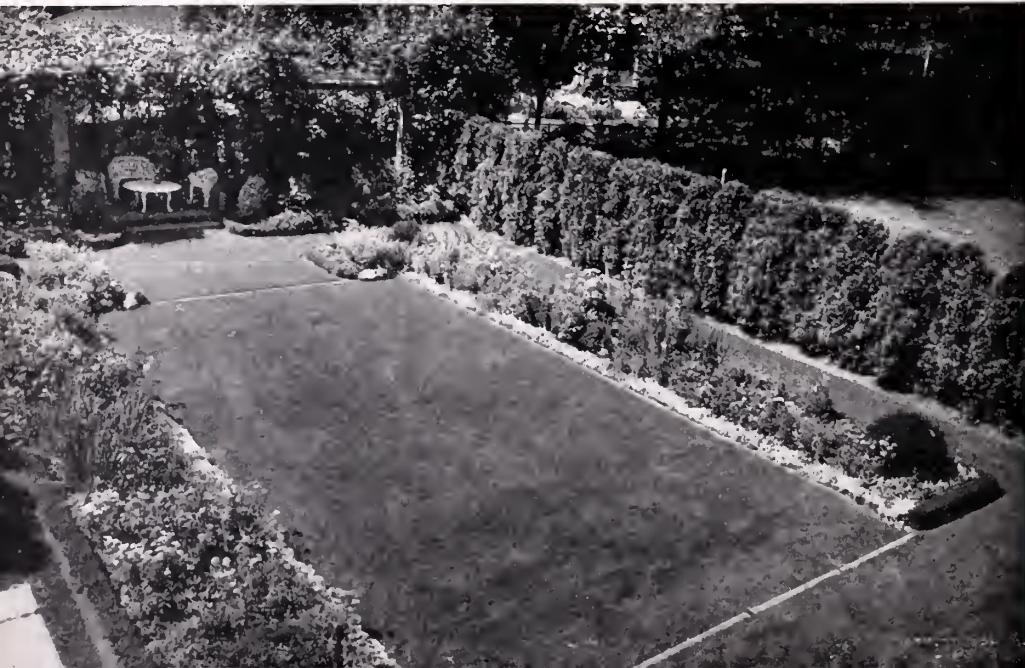
Photo furnished by House Beautiful.

Douglas Baylis, L.A.

These two gardens illustrate equally successful ways of treating almost identical spaces. The simple rectangular design (*below*) has privacy, coolness, and repose—with great quantities of flowers for cutting for the house. The other garden (*above*) has less actual flower space and more area for outdoor eating, relaxing, and sitting; but it has the same quality of repose and restfulness that any good garden has.

Photo furnished by House Beautiful.

Henry L. Pree, L.A.





Harold Haliday Costain photo

Narrow perennial borders above and below a retaining wall give an effect of spaciousness.

PLAN FOR A SMALL PROPERTY

*Making attractive and useful outdoor rooms,
to be maintained with a minimum of care*

Alice Recknagel Ireys

THE plan shows the development of a long narrow lot (100 by 200 feet) in a suburban town. There are several trees that were already on the place, and a lovely low brick house occupied by a family with four young children. The problem was to design a simple landscape plan, allowing space for children's play

and for adult recreation, and insuring easy maintenance.

The plan shows the house placed well back on the lot (as local restrictions required), a two-car garage with the door facing the side of the property, and the development of several garden rooms.



Alice Recknagel Ireys, L.A.

Approach and Foundation Planting

The front, or approach area, always important in landscape development, shows a simple treatment with the previously existing large trees playing an important part. The curved flagstone path from the driveway to the front door has a clump of gray birches (*Betula populifolia*) at the corner, a pink dogwood (*Cornus florida rubra*) in front of the large window, and a low-branched flowering crab apple (*Malus*) near the library window. The use of vines as shown in the photograph provides interesting tracery on the brick walls. The wide plant box beneath the living-room window is filled with tuberous begonias in the summer, and ivy (*Hedera*) in the winter. Mountain-laurel (*Kalmia latifolia*) and rhododendrons, with a ground cover of running-myrtle, or periwinkle (*Vinca minor*), complete the simple evergreen planting along the front of the house.

For Children

The garden area consists of several garden rooms, each one satisfying a different requirement. On the south side the paved garage court serves as a permanent-surface play space during the winter and spring when the ground is likely to be soft and wet. Here the children can use their bicycles or roller skates without injuring the lawn or tracking mud into the house. The children's green garden has ample space for a sunny lawn and for the baby's play-pen, and can be seen from the kitchen window. It also has a flower garden for the youngsters; and in one corner a living Christmas tree plays an important part each year. The children's garden opens into their play space, 20 by 30 feet, surfaced with gravel; in this space, almost surrounded by hedges of

privet (*Ligustrum*) and lilac (*Syringa*), the swings, pools, and slides provide for active play without being too conspicuous.

The porch is used as the children's summer dining room, with easy access to the kitchen.

For Adults

The open terrace is a good place for entertaining and is particularly delightful during summer evenings, when the outline of the tall trees at the back gives a country feeling to this suburban garden.

The remaining garden area, a long narrow open space, approximately 100 by 45 feet, is the part set aside for adult recreation. Here an already existing maple provides shade for sitting and gives an interesting pattern of light and shadow on the lawn. The view from the living-room window, across the terrace, is terminated by clumps of birches with Japanese holly (*Ilex crenata*) and white azaleas for a year-round focal point.

A fan-shaped garden area at the north end, with a low yew hedge (*Taxus*) for a background, has a border for bulbs in the spring and flowers throughout the summer. Abelia and plumbago (*Ceratostigma plumbaginoides*) at each side of the fan make a strong color attraction of pink and deep blue from mid-August to November. Clumps of inkberry (*Ilex glabra*) form a background; and in the corners, hemlocks (*Tsuga*) give height and provide protection for the garden. A storax (*Styrax*) planted close to the walls between the bedroom corner windows, and treated almost like an espalier form, lends a distinctive note to the planting. Clumps of Japanese quince (*Chaenomeles*) are a colorful spring accent at the corner of the bedroom windows. From here to the terrace, highbush blueberries (*Vaccinium corymbosum*) give a simple



Two vines (wisteria and a small-leaved Boston-ivy, *Parthenocissus tricuspidata lowii*), kept in restraint, carry a foliage pattern up the wall.

colorful note to this long facade. The honey-locust (*Gleditsia triacanthos*) in the corner was selected especially for its irregular shape; whether it is seen from the terrace or from the porch it makes an interesting outline against the low brick building or an unusual silhouette against the sky.

The south end of this long narrow green area is planted with clumps of weigela and viburnum. Interest is added to this corner by an already existing apple tree beneath which a sitting space was made, with spreading yews (*Taxus cuspidata*) marking the entrance, and ferns and violets making a ground cover around the open grass area. This is an ideal place for a quiet hideaway.

A plan such as this shows the changes in garden design that have come about recently throughout the United States.

This garden is to be lived in as additional rooms of the house, thus answering the requirements of more living space for this young family: it makes the most of every part of the property, providing living space, play space, and work space.

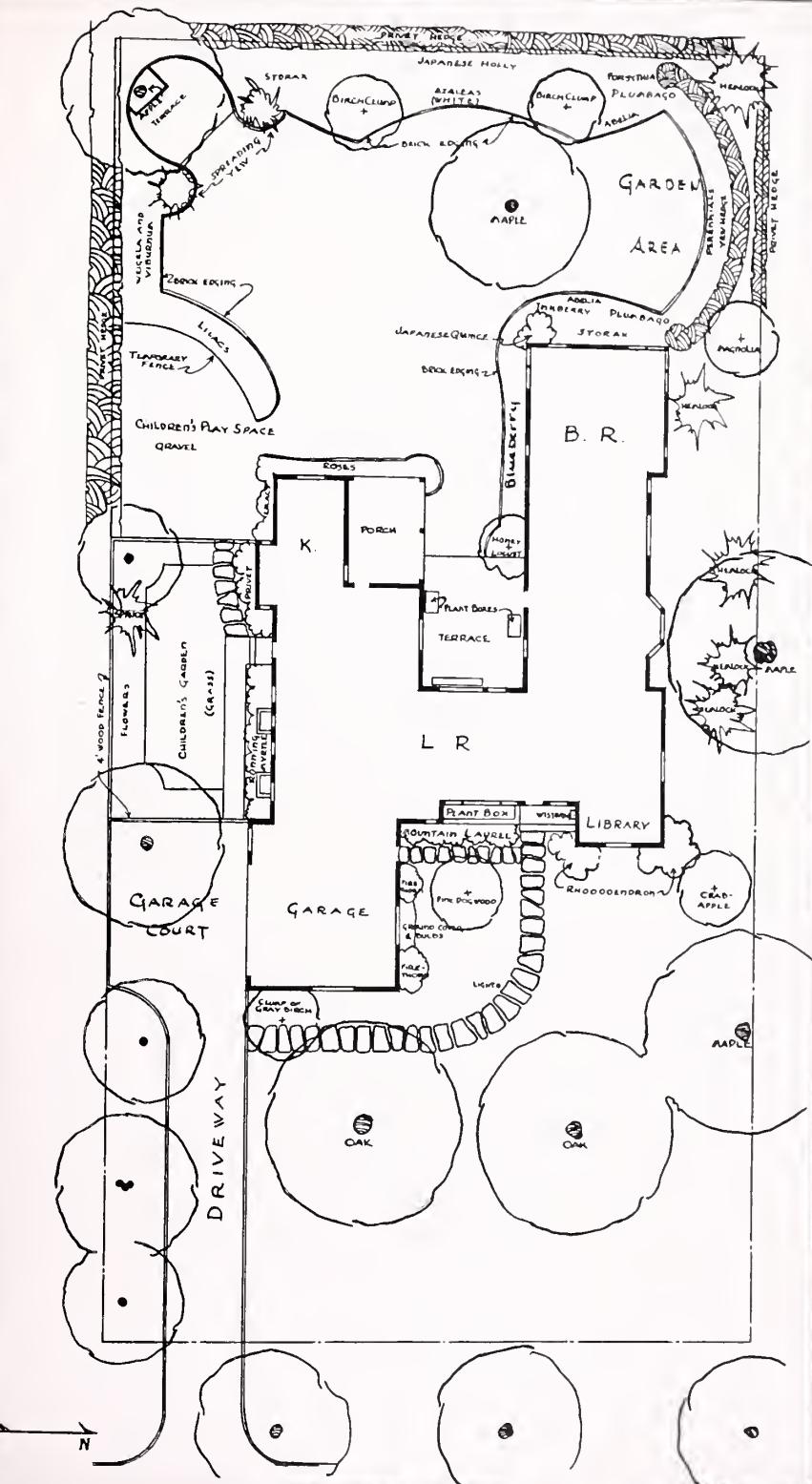
Maintenance

The garden gives a feeling of spaciousness because it can be seen from every part of the house; yet it requires a gardener only once a week during the growing season. There is a considerable amount of lawn, but with modern equipment this can be cut easily; and the beds of shrubs and ground cover need little attention. The small flower border can be cultivated in a short time, and so the ever-important problem of maintenance is well solved.



Alice Recknagel Treys, L.A.

A spreading apple tree provides shade for a secluded spot.



Alice Rechnagel Ireys

GARDENS IN THE SHADE

How to overcome their difficulties by proper choice of plants

Harriet K. Morse

THE gardener with problems of shade need not be frustrated. There are plant candidates aplenty to fit successfully into a variety of shade pictures. To be sure, shade has its many variations, and to measure them with any precision is practically impossible.

The gardener studies his shaded areas during the spring and through the summer to determine the depth of shade he has to reckon with. He examines the soil; perhaps it needs to be enriched or acidified. He notes whether the offending tree branches may be judiciously pruned to let in more light. The trees may create a high cheerful shade, or they may overhang in a gloomy way. Is there perchance strong reflected light from a white wall? Is there destructive drip from house roof? Does the lime from plaster walls alkalize the acidity which some plants demand? Are tree and shrub roots matting the soil?

Perhaps the most sensible approach to the problem is in the choice of the plant materials after the wrongs have been righted insofar as is possible. Of course the shade remains; but it is pleasant to note that there are at least 500 plants that tolerate or even thrive in varying degrees of shade. In this account we are not considering woodland planting schemes, but ideas for a cultivated and landscaped property.

Foundation Planting in Full Shade

Sometimes the house facade faces north or is blocked from the sun by both evergreen and deciduous trees; or the house may be so angled that the foundation planting must lie in perpetual shade. To tie house and grounds together, here are some shrubs for full shade that will grow with a minimum of care; but these will

also grow in sun provided the soil is to their liking.

Hemlocks are the only needle-leaf evergreens that flourish in deep shade; but being eventual forest trees, they need space and should be placed where they will not block the view from the window.

Rose-bay (*Rhododendron maximum*) may be interplanted with sweet azaleas (*R. arboreascens*); both thrive in much shade, and so does drooping leucothoe (*L. catesbeiae*). Several other deciduous azaleas belong in this shade picture, such as pinxter-flower (*R. nudiflorum* and var. *roseum*), pink-shell azalea (*R. vaseyi*), and white swamp-honeysuckle (*R. viscosum*).

For success with all of these shrubs the soil should be moist, peaty, and acid. This condition may be achieved in part by incorporating oak leaves, evergreen needles, and peat moss into the soil, and adding a mulch of the same. These shrubs bear white or pink blossoms and provide a succession of bloom from April through July.

Foundation Planting in Three-quarters Shade

Where the shade is less severe, say three-quarters shade or a dappling of sunshine at intervals, many other woody plants may be added to the above group, all choice and easy to manage.

Yews are evergreen shrubs of great value and endurance in gardens, be they in sun or in shade. Where height is not wanted, the shrubby or dwarf yews should be selected, such as the dwarf English yew (*Taxus baccata nana*) and the shrubby Japanese yew (*T. cuspidata nana*), with their short thick needles.

Among the broad-leaved evergreens mountain rose-bay (*Rhododendron catawbiense*) is suitable — not so tall and

lanky as *R. maximum*. Other rhododendron species and the hybrids may need a little more sun to bloom well. A few evergreen azaleas may be added, such as the Kurume and Hinodegiri azaleas (*R. obtusum amoenum* and *hinodegiri*) and the handsome snow azalea (*R. mucronatum*). The first has fine glossy leaves and magenta flowers, the second has bright pink blossoms, and the last has foliage that is less effective.

Inkberry (*Ilex glabra*) and Japanese holly (*Ilex crenata*) are excellent in shade, and so is the popular "andromeda" (*Pieris japonica*), with its early sprays of waxy white bells.

Flowering Shrubs in Shade

Elsewhere on the property one may wish to make a composition with flowering shrubs in an area where tall trees block out the sun for a large portion of

the day. To the material previously mentioned (except the two *Ilex* species, which produce no noticeable bloom), we may add the following for spring blossoming: spice-bush (*Lindera benzoin*), sweet-shrub (*Calycanthus*), cornelian-cherry (*Cornus mas*), enkianthns, Japanese kerria, several honeysuckles (such as *Lonicera canadensis*, *morrowi*, and *tatarica*), weigela, viburnums (but not *V. carlesii* or *tomentosum*, unfortunately), and shrubby dogwoods (*Cornus*), with white flowers followed by decorative berries and autumn colorings.

For later bloom in the shrub border one may plant sweet pepperbush (*Clethra alnifolia*), St. Johnswort (*Hypericum*), and flowering raspberry (*Rubus odoratus*). The last should be carefully placed because of rose-purple blossoms and coarse foliage; it really does better in a shaded fringe of woodland.

A border with wild sweet William (*Phlox divaricata*) and foam-flower (*Tiarella cordifolia*) for spring bloom. The bold foliage of saxifrage (*Bergenia*), plantain-lilies (*Hosta*), and bloodroot (*Sanguinaria*) provide contrast.

McFarland photo





Gottsch-Schleisner photo

Feathery plumes of astilbe give midsummer bloom in the shade of an old apple tree.

Primroses (*Primula*), ferns, and lady-slippers (*Cypripedium*) surround a small pool in dappled shade.

McFarland photo



Narrow Strip in Shade

Another problem spot is the narrow strip on the shaded side of a house or garage, or a passage between two buildings. Here one may try some planting in the perpendicular. Vines that must climb into the sun to flower, even though planted in the shade, include Chinese wisteria, with handsome trusses in May, and silver lace-vine (*Polygonum auberti*), with white sprays in the summer; the latter, still blooming in the autumn, is joined by clouds of white clematis. Along the narrow strip of earth one may have yellow, white, or blue violets in several varieties, small crested iris, lilies-of-the-valley (*Convallaria*), and wild bleeding-heart (*Dicentra eximia*). Maidenhair fern (*Adiantum*) and Christmas fern (*Polystichum acrostichoides*) fit this setting and so do the minute spleenworts (*Asplenium*) and polypody. Narrow-leaved plantain-lilies (*Hosta*) make pleasant late-summer bloom. The gorgeous-flowered tuberous-rooted begonias liven up this spot and handsomely supply color from July to October. Tuberous begonias, of great value as shade plants, need peaty sandy loam, moisture, and airiness for their best development; they are not winter hardy and must be brought indoors and properly stored for the winter. Impatiens is the one annual recommended for shade and it blooms all through the summer in brilliant pink and coral-red.

Shaded Border

One portion of the flower border may be in the shade; perhaps a neighboring house, a wall, a bank, or evergreen or deciduous trees overhead block out the sun. If the area is bright and airy, with patches of sunlight from time to time or a few hours of direct sun, there are many perennials that do well in such a situation. The soil must be well prepared, perhaps even more richly than in the sunny areas; and there must be no tree root interference to deprive the plants of nourishment and moisture.

Planting under maples (*Acer*), sycamores (*Platanus*), ashes (*Fraxinus*), or beeches (*Fagus*) would probably lead to failure because these trees have many surface roots. Norway maples (*A. platanoides*) also create a deep shade on account of their heavy leafage; under these, ground covers must suffice, some of the old stand-bys such as English ivy (*Hedera helix*), pachysandra, and periwinkle (*Vinca*).

Spring Bloom in the Shaded Border

bloodroot (*Sanguinaria canadensis*)
trillium (*T. grandiflorum*)
epimedium, charming early flowers and
ground-cover foliage
bungle-weed (*Ajuga reptans*)
blue phlox (*P. divaricata laphumi*),
needs spring sun
lily-of-the-valley (*Convallaria majalis*)
crested iris (*I. cristata*)

If the area under consideration is sunny in the spring, and shaded in the summer when the deciduous trees are in full leaf, then practically all the spring-flowering bulbs would prosper there. These include:

glory-of-the-snow (*Chionodoxa*)
winter-aconite (*Eranthis*)
dogs-tooth violet (*Erythronium*)
fritillary (*Fritillaria*)
early species tulips (*T. kaufmanniana*,
fosteriana)
squills (*Scilla sibirica* and *hispanica*)
snowdrop (*Galanthus*)
snowflake (*Lemnocalyx*)
grape-hyacinth (*Muscari*)

Summer Bloom in the Shaded Border

bellflowers (*Campanula latifolia* and
C. laetiflora)
rocket (*Hesperis*)
common foxglove (*Digitalis purpurea*)
common American columbine (*Aquilegia canadensis*), shade of deciduous trees
plantain-lilies (*Hosta*), a dozen or more species and varieties
day-lilies (*Hemerocallis*). About 200



McFarland photo

Ferns and violets abound along this path through a wooded corner.

species and named varieties bloom from May to September but require half sun for prolific bloom.

astilbe in variety

tiger lilies (*Lilium tigrinum*); other lilies, too, in lighter shade

black snakeroot (*Cimicifuga racemosa*)

meadow-rue (*Thalictrum*), several species and varieties

false dragonhead (*Physostegia*)

coral-bells (*Heuchera*)

balloon-flower (*Platycodon*)

Japanese primrose (*Primula japonica*)

Autumn Bloom in the Shaded Border

bugbane (*Cimicifuga simplex*), lower-growing than black snakeroot

mist-flower (*Eupatorium coelestium*)

monkshood (*Aconitum*), in several species and varieties

Japanese anemone (*A. japonica*)

As regards color for the border in the shade, blues and purples are usually not

so effective as are white, salmon, apricot, yellow, and orange. The warm pigments stand out, while the colder colors seem to recede. However, the cool colors may have greater value artistically if one wishes to create a subdued effect.

Because bloom is often less prolific in the shade than in sunshine, the gardener considers not only flowers, but plant structure and texture, autumn foliage, and interesting seed pods. The broad-leaf evergreens are valued at all seasons, with their glossy foliage. The leaves of the short-cluster plantain-lily (*Hosta sieboldiana*), with their unusual veining and frosty blue color, give character and accent. It is interesting to watch the unfurling of fern fronds which change to lacy leaf patterns. There is this also to be said on the credit side: plants in the shade, though less floriferous, remain longer in bloom and are less likely to fade in color; and of course the soil dries out less rapidly.



In this garden, the flickering shadows of spring give way to heavy shade in the summer. Early bulbs thrive in such a setting, along with hemlocks (*Tsuga*) and rhododendrons. Where the shade is lighter, azaleas add color.

Mary Deputy Lamson, L.A.
Richard Averill Smith photo

This sunken garden, which provides sparse bloom, derives its attractiveness from the play of sunlight and shadow on luxuriant foliage.

Gottsch-Schleisner photo



PLANTING NEAR THE HOUSE

Problems and requirements

NO greater test of the designer's skill can be found than the selection and arrangement of plant material immediately adjacent to the house. It may be a dooryard garden enclosed by a small wall or fence, or it may be occasional handsome specimens of plants placed in strategic positions near the house wall. A living terrace outside the living room or dining room of the house may be one of the most important areas on the entire property.

Whatever the over-all design, the plants selected must have certain characteristics. They should be presentable at all times of the year; they should be hardy and free from disease, so that they can be depended on to grow continually handsomer as the years go on; they should have interesting fruit, foliage, or flowers, and (if possible) two or more seasons of particularly fine effect. Some woody plants are handsome at a distance but untidy seen at close range. Others have a subtle flower or fruit texture that is lost if they are not seen close at hand.

Among the vines, akebia, climbing hydrangea (*H. petiolaris*), and almost all the varieties of clematis are excellent choices for porch posts or house walls.

Of the broad-leaved evergreens, those that hold their foliage erect and stay in good color throughout the year are the best choice. Japanese pieris (*Pieris japonica*) is particularly good in semishady spots. Most of the rhododendrons droop so badly in cold weather that they are unattractive at close range in the winter in cold climates.

Unless the foundation of the house is high and unrepresentable, there is no excuse for complete encirclement by a band of planting, however fine the material. Present-day architecture, whether of traditional or contemporary design, allows little or no foundation to show. The only planting necessary is perhaps on either side of a door (if it is a symmetrical house) or on the corners or at architectural spots that need strengthening. The plants to be used should be fine specimens as large as the budget will allow and in proportion to the house itself. Each one should be placed so that it is attractive from both outside and inside the house. It is important to know the rate of growth and ultimate size of plants to be used, so that the planting will not be in danger of outgrowing its location and smothering the house.

Mary Deputy Lamson, L.A.

Gottsch-Schleisner photo

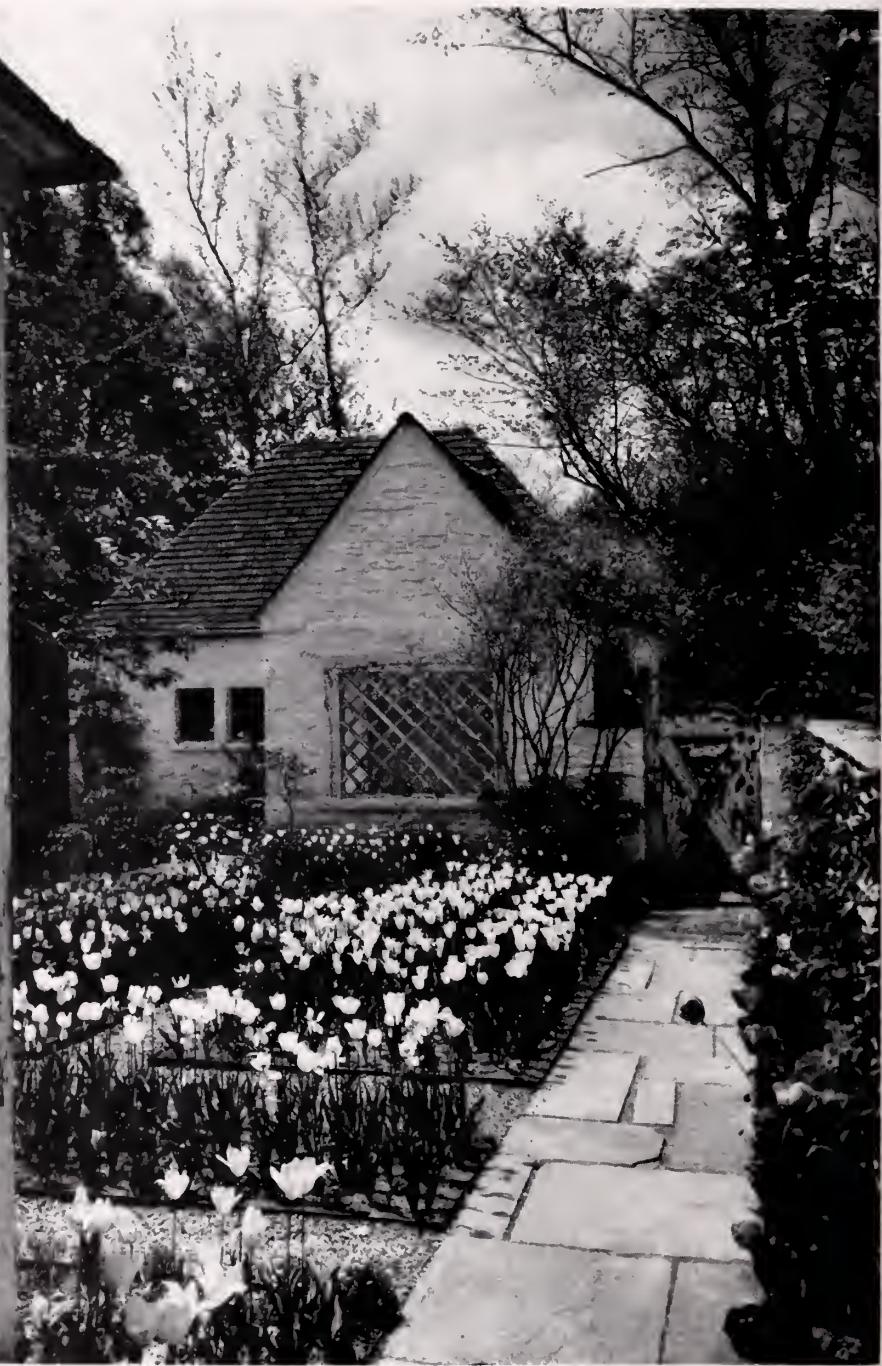




Richard Averill Smith photo

Both of these plantings are distinguished by the use of specimen plants with individual character. They add charm to the house without smothering it.





Harold Haliday Costain photo



Gottsch-Schleisner photo

These three gardens are really present-day adaptations of the old dooryard gardens of New England and the South. Architectural enclosure by fences or walls gives each of them a character of its own.

H. J. Marquardt, L.A.

Harold Haliday Costain photo





This walled terrace adjoining the house makes an attractive outdoor living room.

*Photo furnished by
House Beautiful.*

An old-fashioned perennial border on either side of a gravel walk is a delightful approach to an old house.

 Richard Averill Smith photo





The outdoor living space attached to this California house derives its charm from a fine tree and well designed paving and fence.

*Douglas Baylis, L.A.
Photo furnished by
House Beautiful.*



A large paved area (in slat shade) can be blended with skillfully designed plantings.

*Photo furnished by
House Beautiful.
Thomas Church, L.A.*



GARDENS IN THE COUNTRY

How to plan them on the right scale and with suitable plants

HOMES in the wide open country are a very special problem in design. Whether they are by the shore, on a hill or mountain, or in open rolling farm country, the scale of the landscape is much larger than in towns and must be taken into account. Usually there are views that should be framed or at least should not be shut out by planting close at hand. The planting masses and the special areas like flower gardens or pools near the house must be larger and in good proportion to the big landscape all around. The more elaborate and intricate areas close to the house should not compete with the interest of a distant scene. A small garden pool may be charming in the proper enclosure, but if its background includes a broad river or an ocean, it looks like a tiny and insignificant puddle. If the flower garden and cutting garden have the necessary enclosure, they must be placed where there is no vista to be shut out.

The plant material used in open country is more likely to be in scale if flowering trees rather than shrubs are used. Shrubs are likely to look small and insignificant seen at a distance or against wide views. A narrow flower border or a very tiny garden must be so tightly enclosed that it is adequate in its own right; if seen against sky, fields, or water, the border requires greater width and the garden much larger over-all size. This does not mean, necessarily, more actual feet of flower room, but a larger-scale design with broad grass panels or with flowering shrubs used in conjunction with perennials.

Plants native to the locale are particularly valuable in country plantings. They have the obvious advantage of being adapted to local climatic conditions as plants from other sections may not be.

Even more important, they may be the determining factor in blending the house and its immediate surroundings with the landscape as a whole. In the country, the transition from man-made grounds to the larger scale of nature is a major problem. Introducing near the house the plants that are native to the fields, hedgerows, woodlands, or dunes ties the two areas together immediately and visibly. Beach plum (*Prunus maritima*) and bayberry (*Myrica pensylvanica*) at the seashore, prairie roses and native hawthorns (*Crataegus*) and crab apples on the farmlands of the Middle West, thrive better and look more at home than any of their horticultural relatives.

An excellent way to achieve this feeling of naturalness is to copy the material and arrangement of some attractive plant group in the vicinity, where Nature alone has been the designer. Study of the conditions of sun, wind, and soil will indicate a place for similar or identical plantings. The material should not be collected from the wild, however, but purchased from a nursery, both as sound conservation and as insurance of plants with better root systems.

A wind hazard must be taken into account in most places in open country. This is particularly true, of course, on hilltops or near the shore. Even in open farm land the sweep of wind and storm is likely to damage overtender or brittle plants whether woody or herbaceous. Many of the evergreens, both needle- and broad-leaved, burn in the wind. Very tall garden flowers either snap in a storm or need so much staking that the garden looks like a forest of stakes.

It is an art to get the necessary seclusion immediately around the house without enclosures that cut off the very virtue of spaciousness the place should have.



L. Lundquist, L.A.

Richard Averill Smith photo

A planting near the seashore. Broad flower borders of sturdy annuals and perennials lead along a winding grass path toward the water. Informality of design and width of borders contribute to the success of any planting in open country.



Roche photo



High wind and ocean spray generally make seashore gardens difficult. Here, a sturdy wall protects the flower border. Against the large scale of the ocean, the heaviness of the wall and the width of the borders are in perfect proportion.

Close-up of border shown on opposite page. Marigold (*Tagetes*), hollyhock (*Althaea rosea*), calendula, gladiolus, and ageratum are among the plants successfully growing in the shelter of the wall.

Roche photo





Harold Haliday Costain photo

These flower borders would look like bare ribbons in a flat and treeless lawn. Here an illusion of background is created for them by the slope of the lawn, emphasized by the trees and their shadows.

GARDENS

A sunken garden of shrubs and evergreens is accented in the spring by azaleas and rhododendrons.

Mary Deputy Lamson, L.A.

Gottscho-Schleisner photo





Photo furnished by House Beautiful.

Wendell Richard Gilbert, L.A.

Gnarled old trees shade an intimate terrace and frame a bold distant view.

E C O U N T R Y

Boldly designed lattice is in excellent scale with the country beyond it. Grapevines give partial shade to the terrace.

Photo furnished by House Beautiful.

Lawrence G. Halprin, L.A.



AMERICAN GARDENS OF THREE CENTURIES

*Comparison of their characteristics
and explanation of the changes in their development*

Mary Deputy Lamson

GARDENS are no new interest in America. Almost from the time of the earliest settlers, journals and old records show an interest in plants in their own right and a desire to beautify the area outside the four walls of the house. Of course ideas of beauty and of effective planting have varied from time to time. There have been fads and fancies, good and bad adaptation of ideas from far-away places or from immediate neighbors.

Eighteenth and Twentieth Centuries

Design. The eighteenth and twentieth centuries have shown a great similarity of thought. Many of the principles of design advocated today apply just as well to the best gardens of the eighteenth century as to the so-called contemporary ones. The records of big estates and plantations of the older periods are more complete than those of small gardens. All of them show a considerable flexibility of adaptation from the **English and French and Spanish** gardens familiar to the colonists, and a certain independence of creative thought in fitting those ideas to our economic, social, and climatic conditions.

Eighteenth century gardens, whether those of great estates (like Mount Vernon and Monticello) or of small cottage homes (exemplified in Williamsburg) were for the most part of **geometric perfection** and very fine **balance and proportion**. Most of them show strong English influence. Those on the great estates certainly are the perfect counterpart of the classic tradition of the houses of the era. The smaller gardens are frequently reminiscent of English and French cottage

gardens. They are completely right for the conditions of climate, upkeep, and horticultural knowledge of the period.

Plants. While Colonial Williamsburg has probably done the most complete job of archaeological research in uncovering old gardens and finding out what plants were used in them, their records substantiate the more fragmentary ones of other sections. There was great interest in both woody and herbaceous plants. Many of the plants were brought from **England or France** or from **far corners of the earth** with great difficulty and at great expense; they were spread through the country by seeds, slips, and cuttings and carried by the settlers from the eastern seaboard far into the West.

At the same time amateur and professional botanists were showing interest in the flora of the new country and making constant use of plants not previously known in horticulture. The present interest in and use of **native plants** had its counterpart in eighteenth century gardens. Of the plants listed in "Plants of Colonial Days" (published by Colonial Williamsburg) almost half are natives of this country. Letters of the period between European and American botanists reveal a lively interest in securing new plant materials from this country and great enthusiasm for those introduced into English and Continental gardens.

Maintenance. Another characteristic common to the eighteenth and twentieth centuries is that the gardens of small places were relatively easy to maintain. The colonial gardens, with their paths of brick, gravel, clay, or stone, and their

In these two gardens of Colonial Williamsburg the geometric design is attractive at all seasons of the year. In early spring the flowering bulbs give color and gaiety. The simple ground cover of running-myrtle (*Vinca*) and the hedge of box (*Buxus*) keep the gardens a restful green through the summer.

*Photos courtesy
Colonial Williamsburg*



quite solidly planted beds of a limited number of varieties, could safely be turned over to ignorant labor or cared for in a casual fashion by the very busy housewife of that period. Most of the gardens had definite boundaries of hedges or fences or walls, and only the area immediately inside those boundaries needed to be carefully groomed.

Lawn substitutes. Judging by the old designs and records, vast areas of lawn were restricted to big estates where labor was plentiful. Owners of small gardens generally contented themselves with very small lawn areas or none at all, and used ground covers or paving instead. Apparently, even before the days of chinch bug, Japanese and Asiatic beetles, brown spot, and all the other ills that modern lawns are heir to, the smaller garden had no room and the busy housewife-gardener had no time to pamper grass. The present insistence on substitutes for lawns is not new at all.

Climate control. The adaptation of gardens to climate in the eighteenth century is interesting as a forerunner of the present-day science of climate control. In the East there was less necessity for severe wind control or adaptation. In the prairie states, however, great hedges exist even today, which were planted by the original settlers as wind-breaks to protect the homestead. All over the Middle West and in many parts of the East there are very old stands which were either left from the original native growth or planted two hundred years ago to temper the wind or the sun or in some way to control the climate. The science of climate control was not developed, but the need for it was recognized.

Nineteenth Century

Emphasis. Gardens of the early part of the nineteenth century follow very closely their counterparts of the eighteenth; but just as the houses swung to a new elaboration in architecture and

decoration, the gardens followed the same pattern. There was an increasing interest in plants, and new ones were being introduced; but the emphasis was on the plants themselves and their horticultural excellence rather than on their place in the design of the property.

Ornamentation to the point of ostentation was the rule, so that many fine gardens were ripped up and replaced by plantings of specimens of new species and new varieties. Cast iron in the form of deer, stags, bears, fancy hitching posts, and fountains are an all too well known association with gardening of the Victorian era. With regard to the plants themselves, the same desire for **bizarre forms** and accents (regardless of whether there was anything to accent or not) took the place of careful ground plan and over-all design. Pruning tools were constantly in use, distorting shrubs and trees to round and square shapes. The more ambitious gardeners went as far as horticultural imitations of the iron animals near by.

Not only did the interest in native plants decline, but the careful gardener was satisfied only with **new and strange** colors, shapes, and conformations in his planting. Very often the old geometric gardens were enlarged, or to the owner's mind improved, by the addition of startling features in unexpected places. The old-fashioned perennial border and the well designed small garden almost disappeared; they were replaced by **flower beds** dotted here and there across the lawns of the East and the Middle West. The beds themselves were stars, crescents, circles, and other geometric forms with no background and no relation to any other part of the place, and were filled with **exotic and tender** plants. The well known elephants-ear (*Colocasia*), canna, salvia, and coleus are almost synonymous with the eighteen-nineties, and persisted well into the early part of the twentieth century.

The contribution of the nineteenth

century was certainly considerable as far as new horticultural varieties are concerned, and the introduction of many foreign plants valuable today in our gardens. There was a definite retrogression, however, as regards the garden to live in and enjoy, as we think of gardens today. The gardens of the nineteenth century might almost be summed up as places to show off and to brag about but not to live in.

Twentieth Century

The first quarter of the twentieth century showed a considerable influence from the previous era. Gardens were collections of plants without any particular design. Within the last twenty-five years a great change has come about, expressed in a desire for living outdoors and an awareness of the possibilities of the property as a whole.

Over-all design. Magazines and newspapers have done a great service in educating the public taste to the necessity for sound design of the grounds in their entirety. Instead of wanting to know only the five best varieties of each kind of plant or desiring a collection of one-of-a-kind shrubs, the present-day homeowner seeks knowledge of the way to make his own outdoors both **useful and attractive** so that he and his family and friends can enjoy it all through the year.

Twenty years ago the aid of a professional designer (landscape architect) was sought almost exclusively by owners of large estates. Today there are not only many professional offices specializing in **small places**, but an annually increasing number of inquiries about a master plan or over-all program from owners of property scarcely larger than a pocket handkerchief. As a matter of fact, experience and knowledge are even more important on the small property than on the large estate. On the small place there are more handicaps of houses and garages to be concealed (whether one's own or the neighbors'), of busy and

noisy streets, of shade or sun conditions. More skill is needed to design and carry out a small place well than a very large one. In addition, any mistakes are much more glaring because they are always under one's eye.

Present-day design for outdoors varies greatly in style from the East Coast to the West Coast. There are, however, certain basic needs and principles that apply to the best planned places no matter where they are.

Today's families are building very much **smaller houses** and must therefore carry on more of their life outside the house walls. This means that well planned and efficient as well as attractive areas must be provided for many activities that used to go on entirely inside the house. Eating, resting, playing, working, and entertaining must all be provided for, and all the various areas tied into a plan that is attractive at all seasons of the year, from all parts of the house.

Houses themselves have many more windows and therefore the grounds have much **more visibility**. One area must flow into the next; and utilitarian areas like laundry yards, parking spaces, garden work areas, must be so incorporated in the general scheme that they are, if not invisible, at least unobtrusive.

With all these requirements, the necessity for **easy maintenance** is paramount today as never before. The day of the highly trained gardener is almost gone. Most of the care must be given either by more or less unskilled labor or by the amateur gardener himself. For that reason, mass plantings or fancy flower gardens of innumerable different plants have given way to architectural fences, walls, pavings, and simple structures, so that cultivation, lawn mowing, and gardening chores are at a minimum.

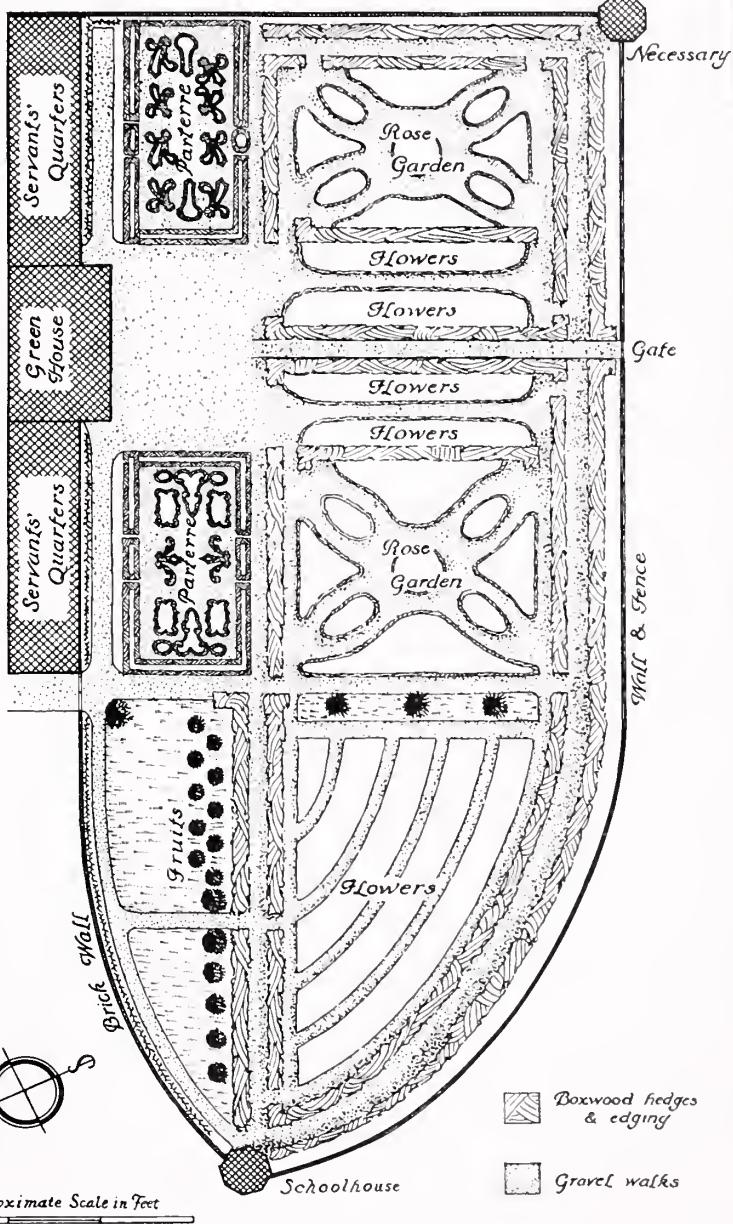
Our places today must be easy to live in and easy to live with; otherwise, the primary function of peace and quiet outdoors is completely destroyed.



The flower garden at Mount Vernon combines pattern perfection (*left*) with tumbled profusion of bloom in the large borders (*above*). The plan of the whole garden is shown on the opposite page.

Courtesy Mount Vernon Ladies' Association

Plan of FLOWER GARDEN





McFarland photos





Harold Haliday Costain photo

Well proportioned gardens of the Victorian and Edwardian eras are rare. These three are interesting in pattern and are excellent examples of the use of bedding plants and roses, both well adapted to pattern beds.



Mary Deputy Lamson, L.A.

Richard Averill Smith photo

This present-day garden would have been equally at home in the eighteenth century.

↗
This well patterned garden in the Georgian style is interesting when seen from any angle.

→
Roses are particularly effective in pattern gardens. This simple design displays the plants to their best advantage and makes them relatively easy to care for in beds of separate varieties.



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McFarland photo





Photo courtesy Washington Cathedral

In the Cathedral garden in Washington, D. C., the enclosure of boxwood (*Buxus*) is an appropriate setting for the perennial border. Partially shadowed by a holly tree, iris, columbine (*Aquilegia*), meadow-rue (*Thalictrum*), and Persian nepeta (*N. mussini*) bloom in April.



A hemlock hedge (*Tsuga*) is a perfect background for the brilliance of a spring garden. Other perennials and annuals will provide gay color throughout the summer.

Harold Haliday Costain photo



A tall wall covered with ivy (*Hedera*) gives the necessary foil for the color of Canterbury bells (*Campanula medium*), larkspur (*Delphinium*), sweet William (*Dianthus barbatus*), late peonies, and columbine (*Aquilegia*).

Richard Averill Smith photo
Mary Deputy Lamson, L.A.





Richard Averill Smith photo

Reminiscent of some English gardens is this tightly clipped maze of evergreens.



The Governor's Palace garden in Williamsburg features this maze of holly.

*Photo courtesy
Colonial Williamsburg*



McFarland photo

This garden is partially shaded by sweet gum trees (*Liquidambar*). The boxwood edges (*Buxus*) and beds of periwinkle (*Vinca*) are simple to care for and provide foliage interest throughout the year.

A formal green garden of clipped Japanese holly (*Ilex crenata convexa*) with pieris for accent, contrasts pleasantly with the rolling country and irregular planting behind it.

Mary Deputy Lamson, L.A.

Richard Averill Smith photo





The horizontal flowering branches of double-file viburnum (*V. tomentosum*) combine well with enkianthus and chaste-tree (*Vitex agnus-castus*).

Mary Deputy Lamson, L.A.
Gottsch-Schleisner photo



The contrast of clipped forms of evergreens with feathery deciduous shrubs gives character to this brick-paved garden.



Harold Haliday Costain photo





Mary Deputy Lamson, L.A.

Gottsch-Schleisner photo

The columnar form of cryptomeria dramatically accents the irregular shape of evergreen azaleas, rhododendrons, and cotoneaster behind the small pool.



Mary Deputy Lamson, L.A.

Richard Averill Smith photo

A handsome specimen of flowering crab apple (*Malus floribunda*) against a low picket fence makes a delightful garden picture at all times of the year.

The bold blossoms of clematis on the posts of a porch show the dramatic effect of one of the finest of vines.

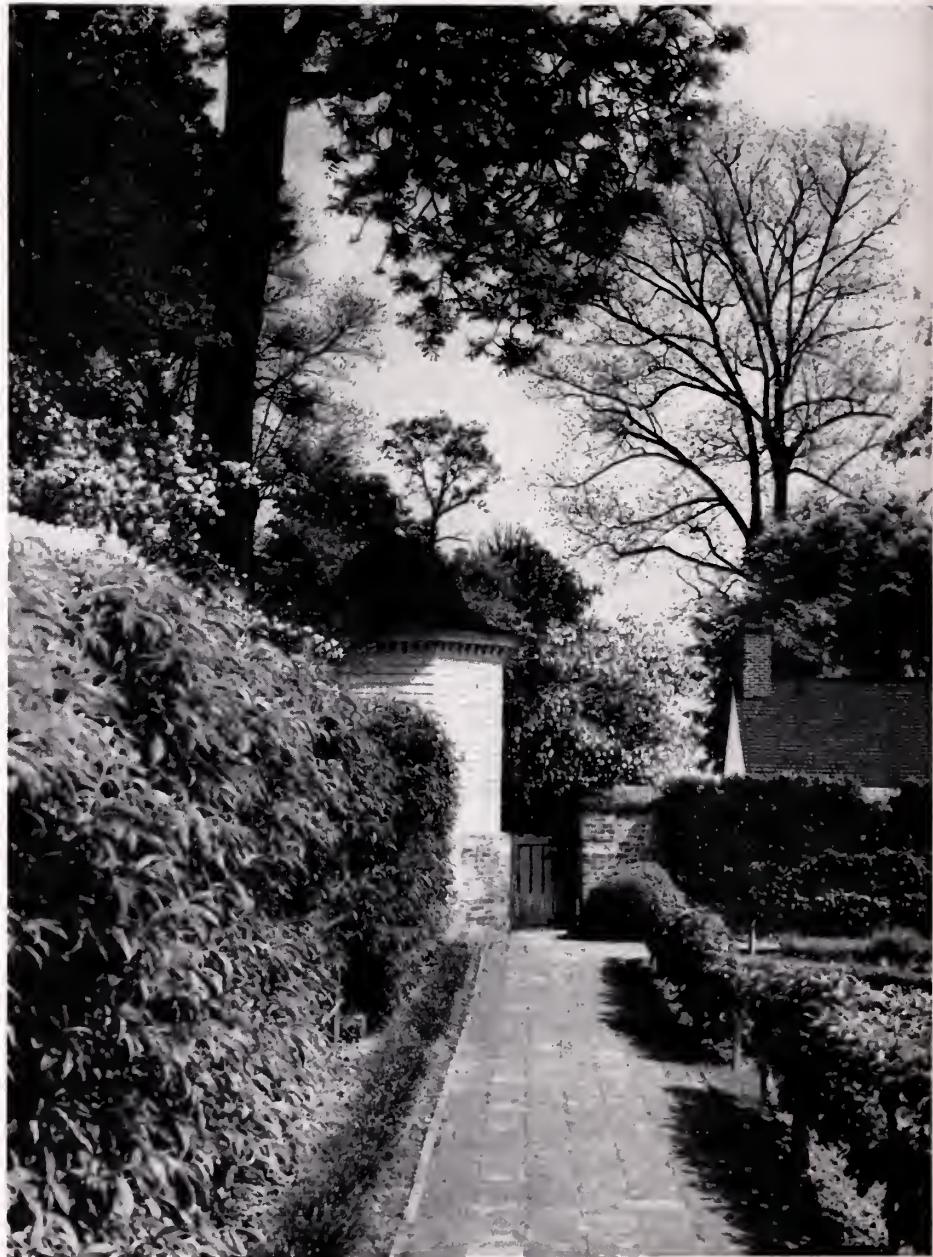
Roche photo



A picturesquely shaped dogwood planted close to the house gives interesting patterns on both terrace and wall.

Roche photo



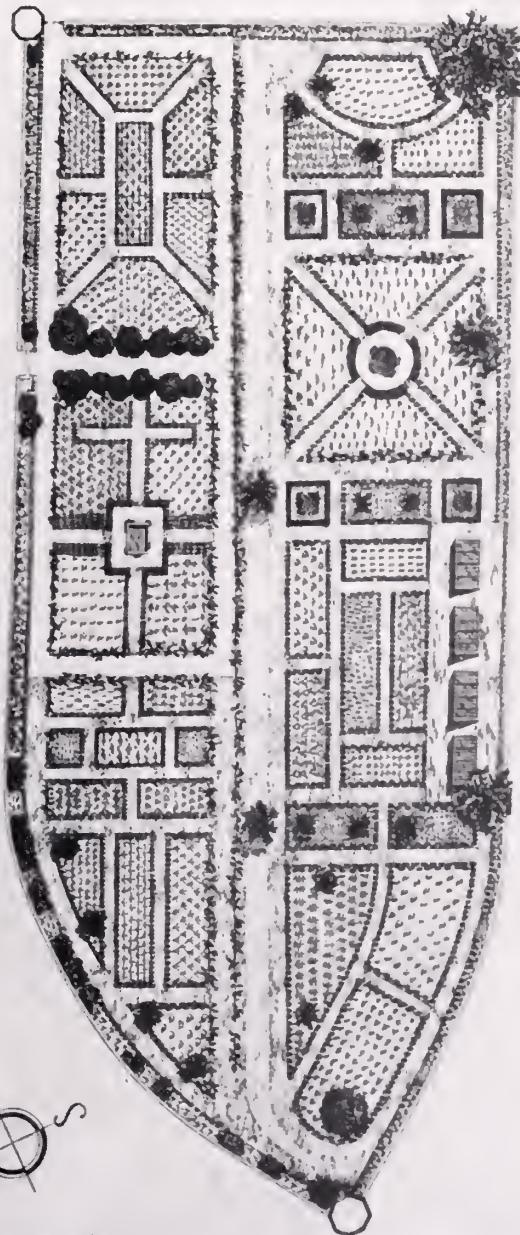


Courtesy Mount Vernon Ladies' Association

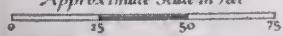
The kitchen garden at Mount Vernon is a perfect combination of practicality and beauty. The complete plan is shown on the opposite page.



Plan of KITCHEN GARDEN



Approximate Scale in Feet





McFarland phot

Borders of chives (*Allium schoenoprasum*) and parsley (*Petroselinum*) are decorative and useful in this vegetable and cutting garden in Colonial Williamsburg.



The interesting form of the beds and the combination of vegetables and flowers make this garden both practical and ornamental.

Richard Averill Smith phot



Vegetables are trained on the fence, and borders of flowers surround orderly rows in this attractive utility garden.

McFarland photos





Gottscho-Schleisner photo

An informal herb garden on two levels.

This herb garden features an earthenware strawberry jar.

Harold Haliday Costain photo





A geometrically patterned, more or less formal herb garden.

Harold Holiday Costain photo



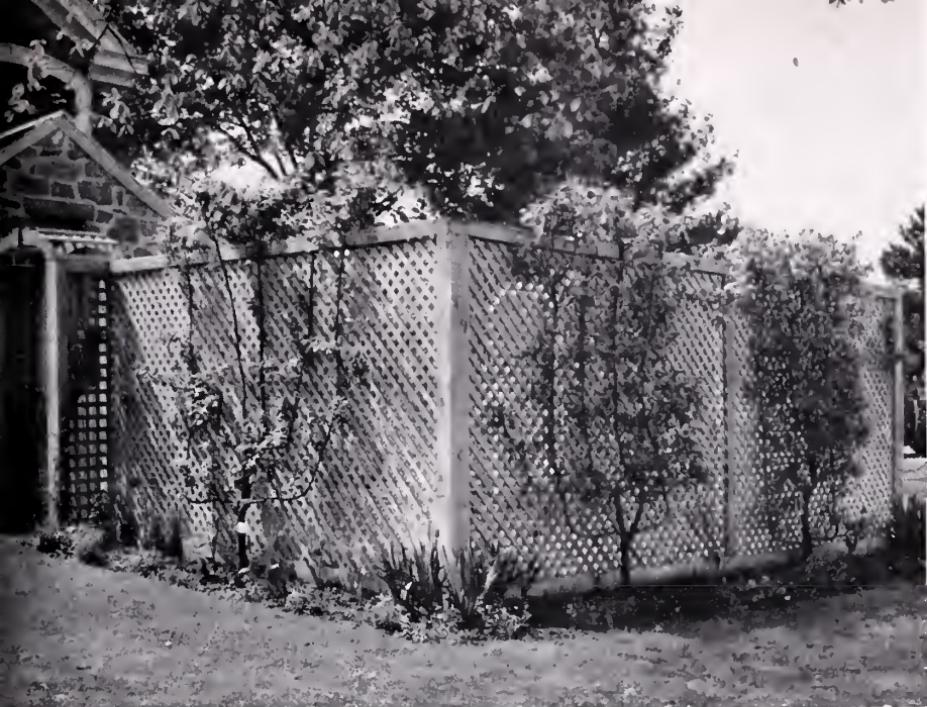
This formal herb garden includes two Elizabethan knot gardens.





McFarland photo

A well cared-for apple tree is a handsome adjunct to the small home.



Richard Averill Smith photo

Where space is at a premium, these interesting espaliered forms are very effective. With a little effort they are easily maintained.

Harold Haliday Costain photo





Grapevines are both handsome and easy to grow. Whether they are over a paved formal arbor or on crude posts above a grass path, they are equally decorative.

Roche photos

CHANGING STYLES IN PLANT MATERIAL

An account of the origin and growth of nurseries in the United States, and of the different kinds of plants they have offered through the years

Peter Cascio

Development of Nurseries

THE nursery industry in the United States has its roots in colonial days and has both influenced and reflected the change in horticultural knowledge and taste.

As early as 1628 Governor Endieott of Salem, Massachusetts, planted apple trees; he is recorded as the first nurseryman in the country. He did not produce the nursery trees he planted, but secured them by exchanging land at the rate of an acre for two young trees.

About 1660 a number of Huguenots came to Flushing, Long Island, and introduced the industry of horticulture, for which the city has been famous ever since. Their success was probably what influenced William Prince to establish, in Flushing, in 1737, the first commercial nursery of record in America. The first known price list or catalog of nursery stock is from Prince's Nursery, printed about 1771, and is now the property of the Philadelphia Free Library.

By 1828, the principal nursery firms of the United States were located at Baltimore, Maryland; Greenwich, Connecticut; and Albany, Bloomingdale, Brooklyn, and Flushing in New York; and by 1850 the nursery industry of the United States was well on its way.

Spread and Specialization

From its early start in and near New York, the industry naturally spread up the Hudson Valley as the commercial fruit business developed. Gradually it

traveled southward and westward, eventually reaching the West Coast.

Every state now has its quota of nurseries sufficient to serve the population resident therein, and there are several well defined areas of wholesale production.

Southeastern Iowa is noted for its large wholesale and mail order nurseries.

The **northwestern part** of the United States is known for its production, not only of finished nursery stock of all types, but also for its fruit seedlings—young trees (propagated from seed) upon which named varieties of apples, plums, pears, and other fruits are budded and grafted.

Rhode Island and Connecticut are the chief states from which evergreens are shipped by the earload to the Middle West.

About the turn of the century collectors of native plants started springing up. In Connecticut, H. Parks Holcomb and Irving Holcomb of Granby, the latter considered an authority on botany in New England, started collecting and shipping native plants in 1903.

In 1931 bits of old Connecticut were shipped by rail by the carload to Michigan, Kentucky, Pennsylvania, and Vermont. The total number of mountain-laurel plants (*Kalmia latifolia*) shipped by Holcomb's Evergreen Nursery that year was 26,000. Other native plants shipped were hemlock (*Tsuga*), juniper, hard and soft maples (*Acer*), beech (*Fagus*), birch (*Betula*), oaks (*Quercus*), blueberries (*Vaccinium*), viburnums, aza-



Wisteria.

leas (*Rhododendron*), spice-bush (*Lindera*), shadblow (*Amelanchier*), and many wild flowers.

Now most of the collectors are in North Carolina. There are hundreds of small firms and three or four large ones.

About 1920, when many Hollanders came here and furthered business with European propagators, we were still importing from Holland most of our ornamentals such as azaleas, rhododendrons, evergreens, and roses. With landscaping of homes on the increase, the European propagators came to this country with centuries of horticultural background and started nurseries, largely of fine ornamentals.

In 1899 there were approximately 5000 firms in the United States that indicated they were producing what we now know as nursery stock, and they reported a business of \$10,000,000. In 1949 the estimate was a \$300,000,000 industry, with about half that sum being designated as the farm value.



Rocke

Flowering branches of *Clematis paniculata*.



McFarland

Bridal wreath (*Spiraea prunifolia*).

Advertising and Delivery

In pioneer days, traveling agents went from farm to farm taking orders for nursery stock for later delivery by wagon. Today such stock is delivered by express and parcel post—expertly grown and stored by the grower, scientifically wrapped and handled, and delivered at the proper time for planting. Nurseries so operating are called **agency firms**, and this type of distribution is still a considerable source of plant material.

Many **retail firms** publish annual catalogs and depend on orders from the wide distribution of the catalogs. A recent summary showed that the mail-order nurserymen of the United States annually distribute approximately 40 million catalogs—one for every four persons in the country.

In the first quarter of this century nurseries issued voluminous catalogs periodically, but not annually, and frequently not dated. These catalogs contain much valuable horticultural infor-

mation, in addition to a complete list of nursery stock; they show a most interesting change in horticultural taste.

Kinds of Plants

At the outset the nursery business was devoted basically to the production of **fruit trees** for the pioneers. Early in its history a line of **ornamental** and decorative plants was added, for even in early colonial days people wanted beauty around their homes and log cabins, as well as utilitarian and food-producing trees and shrubs.

Fruits. An old catalog of the Stephen Hoyt's Sons Co., Inc., New Canaan, Connecticut, like most of the catalogs of 1900 to 1925, is full of general information, including how to plan a spray calendar, with a page on how to make and mix the relatively few insecticides and fungicides used in the early part of this era. Of thirty-one pages devoted to nursery stock, nineteen are devoted to fruits—in contrast with the 1952 cata-



Periwinkle, or running myrtle (*Vinca minor*).

McFarland

log, in which all the fruits offered could be put on one page. The fruit section is at the front of the old catalog; nowadays it is tucked away in the last pages.

In 1880 the Siebenthaler Company of Dayton, Ohio, listed many fruits—for the most part of varieties unknown today.

In the ornamentals they list (in 1880) :

Trees, etc.

American chestnut (*Castanea dentata*)
Clematis jackmani
flowering almond (*Prunus triloba*)
Chinese evergreen honeysuckle, 75¢
blood-leaved peach, 50¢
rhododendron, \$2.50
Spiraea billiardii
sweet-shrub (*Calycanthus*), 75¢
Wisteria magnifica (*macrostachya*)
Roses
BALTIMORE BELLE

CAROLINE DE SANSAL, 50¢

GENERAL WASHINGTON

LION DES COMBATS, 50¢

MARECHAL NIEL, \$1.25

PIUS IV, 50¢

REINE DES VIRGES, 50¢

SEVEN SISTERS, 75¢

Peony

ALBA VARIEGATA, \$2

Miscellaneous

Siberian arbor-vitae (*Thuja*)

European larch (*Larix decidua*)

Irish juniper (*Juniperus communis hibernica*)

Austrian pine (*Pinus nigra*)

weeping tree rose

smoke-tree, or purple fringe (*Cotinus*)

mountain-ash (*Sorbus*)

weeping mountain-ash (*Sorbus*)

Kilmarnock willow (*Salix*)

new American weeping willow (*Salix*)

Norway spruce (*Picea abies*)

By 1900 their ornamentals include:

Trees

purple-leaved beech (*Fagus sylvatica atropunicea*)
weeping birch (*Betula*)
catalpa
Catalpa bungii
Camperdown weeping elm (*Ulmus glabra camperdownii*)
maidenhair-tree (*Ginkgo*, or *Salisburia*)
horse-chestnut (*Aesculus hippocastanum*)
maple (*Acer*)

MANITOBA

Norway (*A. platanoides*)
silver-leaved (*A. saccharinum*)
sugar (*A. saccharum*)

Evergreens

arbor-vitae (*Thuja*)
American (*T. occidentalis*)

PYRAMIDAL

Siberian

balsam fir (*Abies balsamea*)

Scots pine (*Pinus sylvestris*)

Norway spruce (*Picea abies*)

Shrubs

double althea (*Hibiscus syriacus*)

barberry (*Berberis thunbergii*)

Boston-ivy (*Ampelopsis veitchii*, or *Parthenocissus tricuspidata veitchii*)

Clematis

henryi (*lawsoniana henryi*)

jackmani

MME. EDOUARD ANDRÉ

paniculata

Deutzia

crenata (*scabra*)

gracilis

PRIDE OF ROCHESTER

Dutchmans-pipe (*Aristolochia durior*)

Halls Japanese honeysuckle (*Lonicera japonica halliana*)

forsythia

fringe-tree, or white fringe (*Chionanthus*)

Hydrangea

paniculata grandiflora

tree, or standard

Kerria japonica

Chinese matrimony-vine (*Lycium chinense*)

mock-orange, or syringa (*Philadelphus*)

Siberian pea-tree (*Caragana arborescens*)
California privet (*Ligustrum ovalifolium*)
smoke-tree, or purple fringe (*Cotinus*)
Japanese snowball (*Viburnum tomentosum sterile*)

snowberry (*Symporicarpos albus*)

Spiraea

ANTHONY WATERER

aurca

callosa (japonica)

callosa alba (japonica alba, or japonica ovalifolia)

prunifolia (bridal wreath)

vanhouttei

sweet-shrub (*Calycanthus*)

weigela

EVA RATHKE

white

wisteria

Roses

CLIO

CRIMSON RAMBLER

DOROTHY PERKINS

KAISERIN AUGUSTE VIKTORIA

PAUL NEYRON

PRINCE CAMILLE DE ROHAN



Roche

Flowering branches of trumpet honeysuckle (*Lonicera sempervirens*).



McFarland

Deutzia.

Peonies

Chinese herbaceous
red variety

ROSEA SUPERBA

Lilacs (*Syringa*)

ALBA GRANDIFLORA

Persian (*S. persica*)
purple

Bay State Nursery catalog (Windsor H. Wyman, proprietor, of North Abington, Massachusetts), printed about 1905, had already relegated the fruits to the back pages but still offered nine pages of them; whereas today all the fruits are on three pages.

Perennials. There is a section devoted to perennials in the 1905 Bay State Nursery catalog and in later ones, into the nineteen-thirties. This year's catalog reduces perennials to five pages. Fewer and fewer nurseries are now growing and selling perennials. Most of the perennials come from comparatively few nurseries, which specialize in them, and most of them are shipped through the mails.

A recent letter from Donald Wyman of Bay State Nurseries says: "We are finding a steadily diminishing demand for perennials. . . . A greater number are

planting annuals. . . ."

Woody plants. Also Mr. Wyman says: "The larger-growing firs, spruces, and many varieties of deciduous shrubs, have been replaced by more extensive growing of juniper, *Taxus* in particular, broad-leaved evergreens, and shrubs of a type that can be more readily restrained."

Roses. Bobbink & Atkins' early catalogs show page after page of roses. Section I, the Rose Division, lists many Hybrid Perpetual, or Remontant, roses. Recent catalogs show very few Hybrid Perpetuals, as the public demand is for Hybrid Teas and Floribundas. The varieties of Tea roses listed in the early catalogs are practically unknown today, as more recent introductions have taken their place. A page is devoted to the Tea-scented roses, now seldom heard of. There are no Floribundas listed but there are a few dwarf Polyanthas. Roses then sold at 35¢ retail. Standard or Tree roses retailed for 75¢ each.

Ornamental Evergreens and Conifers are in Section II. There are twenty-six varieties of *retinospora*, or false cypress (*Chamaecyparis*) listed, in contrast with

recent wholesale and retail catalogs which do not list one. In this catalog they list thirty-two varieties of abor-vitae (*Thuja*); today they list four. The many topiary boxwoods (*Buxus*), Camperdown weeping elms (*Ulmus glabra camperdownii*), and *Catalpa bungei*, popular in the old days, have also practically disappeared from the market.

Styles continue to change. In the old days plantings were chiefly of cedars, abor-vitae, and false cypress. Landscape designers use very few of these plants today, and put them only in special locations where better plants will not do. These plants have given way to such material as yew (*Taxus*), broad-leaved evergreens, and azaleas.

Around houses now being built, the trend is away from mass plantings of the types of plants listed above, and toward specimen plants surrounded by masses of ground cover. Walls, terraces, pools, and fences are on the increase and take up a considerable part of the landscape budget. Greater use of Japanese-spurge (*Pachysandra*), periwinkle (*Vinca*), and *Euonymus fortunei coloratus* is made, with here and there a fine specimen tree, shrub, or evergreen.

Flowering trees. The early catalogs list a few flowering trees, chiefly dogwood (*Cornus*) and magnolias, and usually either in the shade tree section or the shrub section. New catalogs have sections entirely devoted to this increasingly popular group, with a great many species and varieties. The changes in the lists of deciduous shrubs indicate an awareness of all-year effect, and of fruit, winter effect, foliage, texture, and color, instead of only flower. Forsythias, weigelas, honeysuckles (*Lonicera*), and deutzias are still in the lists, but to them have been added many berried plants like linden viburnum and Siebold viburnum (*V. dilatatum* and *sieboldii*), cranberry-bush (*Viburnum opulus* and *V. trilobum*), black-alder (*Ilex verticillata*), and the cotoneasters; shrubs of fine form like



Roche

Fruiting branches of winterberry, or black-alder (*Ilex verticillata*).

burning-bush (*Euonymus atropurpureus*), enkianthus, double-file viburnum (*V. tomentosum*), deciduous azaleas, and highbush blueberry (*Vaccinium corymbosum*).

The 1903 and 1953 catalogs point very clearly to a desire for plants that will compose a fine over-all picture for the homeowner rather than the miscellaneous collections of the Edwardian era.



Roche

Flowering branches of highbush blueberry (*Vaccinium corymbosum*).

WITHIN THE BROOKLYN BOTANIC GARDEN

FLOWER SHOW EXHIBIT

Pruning is one of the most perplexing of garden arts and sciences. "How can I tell the difference between a flower bud and a leaf bud?" "What is a water sprout?" "Is it too late to prune my grapevine?" Over 3600 such questions were asked by visitors at the Brooklyn Botanic Garden's exhibit on pruning at the International Flower Show in New York in March, 1953.

The display was made up chiefly of

labeled shrubs and trees with their branches painted gay colors to indicate the proper place and time for each pruning operation.

Added to the generous praises of visitors to the show was the awarding of the Gold Medal of the Horticultural Society of New York and the Bronze Medal from the Federated Garden Clubs of New York State.

L. H. W.



BROOKLYN BOTANIC GARDEN

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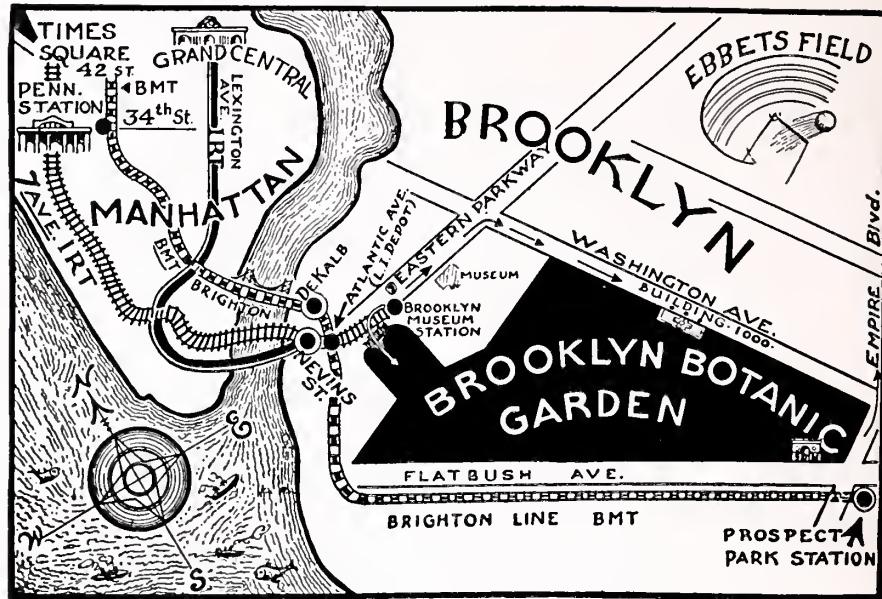
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B.M.T. (Brighton Beach line) downtown express or local to Prospect Park Station.

I.R.T., West Side (7th Avenue or Broadway-7th Avenue line) downtown express marked "New Lots Avenue" or "Flatbush Avenue," to Eastern Parkway-Brooklyn Museum Station.

I.R.T., East Side (Lexington Avenue line) downtown express marked "New Lots Avenue" or "Utica Avenue" or "Atlantic Avenue," to Nevins Street; step across platform and change to 7th Avenue or Broadway-7th Avenue train, ride to Eastern Parkway-Brooklyn Museum Station.

By Bus

Flatbush Avenue bus to Empire Boulevard
 Lorimer Street bus } To Flatbush Avenue
 Tompkins Avenue bus }

Union Street bus } To Prospect Park Plaza
 Vanderbilt Avenue bus }

By Automobile

From Long Island, take Eastern Parkway westward, and turn left at Washington Avenue.

From Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway; follow the Parkway to Washington Avenue, then turn right.

PLANTS & GARDENS

UTUMN
1953

Dwarfed
Stunted Trees
the Japanese
Grow Them

Comprehensive
Handbook
on
Kinds
Training
Culture

SERIES
NO. 3



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Separate copies of this handbook on dwarfed potted trees are available at \$1 each, postpaid.

PLANTS & GARDENS

Adams-needle (*Yucca filamentosa*)

Louis Buhle

VOL. 9

Autumn, 1953

No. 3

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Editorial

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Except where otherwise credited, photographs furnished by Kan Yashiroda.

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E. Satomi

An old but miniature forest of Yeddo spruce (*Picea jezoensis*).

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Autumn 1953

The art of growing dwarfed potted trees, or bonsai, may be as old as a thousand years — perhaps more, and is unique among the many fine contributions of the Japanese people to horticulture.

These potted trees are kept small by special culture and training, thus are artificially dwarfed. If allowed to develop naturally, they would grow ten to fifty times as tall. In sharp contrast with these artificially dwarfed trees and shrubs are the natural dwarfs, i.e., plants that are low in stature by inheritance; these were featured in PLANTS & GARDENS for autumn 1949.

There are some who think that bonsai are for the Japanese, not for others — certainly not for Americans. I cannot believe this is a true appraisal of the breadth of interest and skill of the more discerning amateur horticulturists of the Occident. True, some say they require too much care, or are too much work. The fact is that they require no more attention than many people now give their favorite house plants.

In the past few years, florists in the United States have sold what they call "Ming Trees." These are artificial forms; in no sense are they to be compared to or thought of as bonsai.

The "living Ming tree" advertisements that appear more or less constantly in gardening magazines purport to offer all the "secrets" of growing bonsai; in reality there are no secrets and never have been. The 88 pages that make up this special handbook give the fundamentals of growing dwarfed potted trees. Skill comes only with experience. Bonsai specimens that have character cannot be grown in two or three years, or even in five or ten. But this need not be discouraging, as the following pages make clear.

It has been a great pleasure for members of our Editorial Committee to work with Guest Editor Yashiroda. It is he who has bridged the gap of language to bring English-speaking readers this authoritative account, written by himself and several of his respected fellow bonsai fanciers.

Sincerely,



Director



An amateur bonsai fancier at work among the dwarfed trees in his back yard.

THE AMATEUR BONSAI FANCIER

*Something about the tradition and spirit of bonsai,
and what the amateur can accomplish*

Kan Yashiroda

History of Bonsai

IN A remote age, some workaday person or some great genius who was very impressionable and artistic must have been moved by the great beauty and loveliness of nature and must have felt deep peace of mind when imbued with that atmosphere. In the first flush of this

feeling, the idea must have come into his mind to copy some of the beauties of nature, in miniature, in containers—in other words, to create *bonsai*, or dwarfed potted plants.

The oldest authentic record of bonsai is pictures of dwarfed trees and herbaceous plants in containers in a noted scroll written in 1310. Through

the long age of the civil wars in Japan the cults of nature-bonsai, flower arrangement, and tea ceremony became deep-rooted in average men and great heroes alike.

Then came the **Tokugawa Era**. Turning the leaves of old Japanese gardening books published in the seventeenth and eighteenth centuries, I often come across illustrations and descriptions of bonsai. From these I am convinced that the people of that time were very skillful in dwarfing and training plants and that they had great desire to find new kinds of plants that could be dwarfed successfully.

The accompanying photograph of winter daphne (*D. odora*) is reproduced from a book published in 1827; it shows a crested branch which was rooted as a cutting and perpetuated and trained as a bonsai.

The second photograph is reproduced from a book published in 1837. The first glance shows merely a completed bonsai; but closer inspection reveals that on each branch of the thread-form Sawara cypress (*Chamaecyparis pisifera filifera*) one to three scions of Hiba arbor-vitae, or false arbor-vitae (*Thujopsis dolabrata*), have been grafted. When the graft unions are completed, all the branches of Sawara cypress are to be cut off and the whole tree converted into Hiba arbor-vitae.

These are not childish attempts or vague ideas but are the products of long years of an age of military ascendancy, when every profession was hereditary—the time called the Tokugawa Era. In those wonderful long peaceful years, the Japanese people were accustomed to escape from daily life into something that interested them; they devoted their leisure time to things that freed them from the restraint of social life; they entered into friendly rivalry with their fellow fanciers or tried to surprise them in some way. Hence improvement, discovery, and skill in the art of bonsai were much advanced by amateur fanciers. When amateurs have their enthusiasm aroused, they are always without regard for the gain or loss in-

volved; that attitude greatly advanced bonsai.

Professional men have been interested only in seizing the cream of the amateurs' discoveries in ideas and in materials. Therefore I praise the amateur bonsai fanciers. In Japan there are nearly as many amateurs as bonsai trees. A large number of them are worthy of saying, as did G. K. Chesterton, "We wear proudly the name of amateur."

Example of an Amateur

As an example of an enthusiastic amateur bonsai fancier, I will tell you of a Mr. Watanabe of the city of Takamatsu, a place noted for bonsai and cage-bird fanciers.

Mr. Watanabe is a salaried man, past middle age. Since the time in his youth when he worked in the Takamatsu post office, he had been enthusiastic about bonsai as a hobby and had built up a varied and interesting collection. Then on a hot summer day in 1945 his house and all his collection were burned and completely destroyed by bombing. A few blank years passed. Gradually, relieving him from self-abandonment, his enthusiasm for bonsai revived and crept back into him. The accompanying photograph shows part of the result. Beyond the bonsai shelves can be seen a field of grass where dwelling houses once stood in rows. The only other visible sign of the influence of war is several rows of barbed wire encircling the bonsai to protect them from the mischief of passers-by. In taking the pictures I was very careful to keep the wire out of sight as much as possible. "Everybody has come back nearly to the standard of bygone days in clothes, but why not in morale and in taste?" he complained to me, not hatefully or scornfully, but regretfully.

The mental effect that force had, has remained in many cases. However, I have come across young men who are planning to gain refined taste and pleasure by growing bonsai. Some Americans living in Japan also seem to be attracted to bonsai "simply to waste time," as an



1827 print. See preceding page.

American Army Colonel said during a course of instruction on bonsai technique at the bonsaimen's. Doubtless a more serious purpose will be found in many Americans and people in other countries.

Spirit of Bonsai

An old-timer in bonsai (introduced to me by a friend) wrote me a story that has been current in his district for many decades: An American picked up a Japanese black pine bonsai and asked its price, of the farmer who raised it. When the satisfied American had gone nearly out of the gate, it occurred to the farmer that if he said that price was only for the tree, the buyer would pay a little more for the container. He hurried out and asked for the money for the container. On hearing the insatiable claim, the American pulled out the tree the farmer

had treasured and threw it to him, saying "I need only the container."

In telling me this story I think my friend has kindly warned me of the difficulty of making known the *spirit* of bonsai. Whether or not it is possible to convey the *spirit* of noble bonsai raised by worthy growers, it should be easy to describe the technique generally practiced in Japan and to transmit some appreciation of dwarfed trees. It should be possible for the culture of bonsai to be practiced and enjoyed in other countries, and to be adapted in one way or another to the life there.

Since we were beaten in the war and Americans have come in and shown interest in bonsai, some young Japanese bonsai growers are representing themselves as *artists* and bonsai raising as strictly an *art*. If this is so, it is not necessary to use the words "artist" and "art"! This is the last thing that comes to the amateur's mind. The amateurs are generally far

1837 print. See preceding page.



cher in culture and talent than the men who cry out that they are artists of bonsai. Possibly the real spirit of the cult of bonsai is passed down from father to son, even though amateur bonsai fanciers often show amateurish and poor attempts at growing and training bonsai.

Kinds of Bonsai

There is a wide range of rank among bonsai. One can easily distinguish a mere potted plant from a noble old bonsai; but there are many gradations between the two and there is no strict rule to draw a line between them. Sometimes it is impossible to say which is which—as with the man and the pig in George Orwell's *Animal Farm*.

On mound of soil. The amateur's so-called amateurish efforts in attempting bonsai in unusual ways or according to his own ideas are always associated with his daily life, since reward in money is the least consideration to him; thus they give him endless pleasure, though they may seem childish to the orthodox grower. Such an attempt in Mr. Watanabe's collection is the seedlings of Japanese black pine grown on the mound of soil in an old tile. For a few years after the bombing, the ground in practically the whole city was covered with tiles like his one. The bonsai was started by sowing the pine seeds directly on the mound,

Ever since they were very young, the little trees have been cut back or pinched off repeatedly and severely, and their long needles cut in half. Now it looks very nice; and when it has grown only a few years more, no one could call it a childish effort—as he might do now without knowing the aim.

Various conifers and many other kinds of trees are grown and trained nicely in this novel way, starting from seed. In trying these one may pinch and cut back to his heart's content; for a man of discernment will find something to be treated with finger nail or shears almost every day in the course of a year.

It is often said that the best means of controlling temper is to sit down before one's favorite seedling bonsai-in-the-making and trim them to one's satisfaction. I know quite well that there is some truth in this, as I have thus disciplined myself sometimes. This shows that repeated and sometimes very deep cutting back are necessary, to make these seedlings dwarf and finely shaped.

The soil mixture and other materials to make the mound are an interesting problem. One must consider the nature and behavior of the trees sown in it and grown on it; the color, to harmonize with the surroundings; the shape of the mound; water-holding quality and drainage; sunshine, rainfall, wind, drought,

Japanese black pines (*Pinus thunbergi*) raised from seeds sown directly on a mound of soil on a tile.





First stage in development of bonsai from naturally dwarfed Japanese black pine collected on mountainside. Given time and proper training this unlikely-looking attempt may become a fine example of the art of bonsai.

the degree of freezing of the climate, and other such elements. The soil formed by the entangling and decay of the fibrous roots of the resurrection plant (*Selaginella lepidophylla*) is often used in part or all of the mound.

Original design. Another amateurish attempt is shown in the photograph of the Japanese black pines in the shallow container. Climbing a mountain a few years ago, the amateur found several young pine trees of tempting shape and somewhat dwarfed naturally, and brought them home and tried them in an ambitious way. They still look like very poor things, but the grower is showing confidence in his attempt. How they will improve as they grow older remains to be seen: that is an interesting point in bonsai growing.

Miniature forest. The picture of Japanese white pine on the next page shows an orthodox method which Mr. Watanabe has started, a method of producing a many-trunked bonsai from one tree. Obtaining a small, well branched Japanese white pine tree from a nursery last year, he planted it in the shallow container, not in the normal way but with the trunk laid horizontally, most of its length just under the surface of the soil. The base of each branch is in the soil, the tip projecting

above the surface, as shown in the photograph. The new growth of the year looks very promising, to grow into nice trunks in years to come. On pages 155 and 156 are photographs of similar forms, more mature. Each of these photographs shows not many trees but the branches of a single tree.

I highly recommend this method to my American neighbors. All that is necessary is to pick out a few conifers or other trees from some nursery near home. This kind of bonsai is very easy to grow and manage, and it will not be long before a fine miniature forest is formed in the container.

Plants

Flowering trees. In the villages and hamlets in the mountains of Japan, near houses or on the borders of terraced cultivated lands, one often comes across old stunted trees of Japanese flowering apricot (*Prunus mume*), with trunks nearly rotten but with vigorous young shoots. In late winter or early spring the trees are smothered with blossoms.

Mr. Watanabe brought home one of those trees and trained it into a bonsai. He kept only part of the rotten trunk and cut off nearly all of the roots almost at the base, carefully keeping as many

panese white pine (*Pinus parviflora*) with the trunk in a horizontal position and entirely covered with roots. When the roots develop they will form a many-trunked bonsai. See pages 155, 156, and 157.



e fibrous rootlets as he could. The result is shown in the photograph on the next page.

Soon after flowering is over, every root is cut back to two or three buds; from these buds new shoots will soon grow and replace the ones cut off. Cutting back is repeated every year after flowering. Whenever buds are formed so close to the trunk, very deep cutting back is practiced in order to keep the tree dwarf in stature and to improve the artistic shape of the bonsai.

When I was young, I took home from my father's apple orchard some hollow old rotten-trunked trees, sawing them down to a height of 1½ feet or so. I grew them for a season in the garden and then put them into containers. They were nice bonsai; I well remember that one of them as one of my proud possessions. Old orchards of deciduous fruit trees are rich and profitable places to procure materials for bonsai. Crab apple (page 194) and species of *Malus* used as stocks and found remaining in unproductive orchards may also provide suitable material.

Firethorn (*Pyracantha angustifolia*) is much used as a dwarfed potted shrub in Japan. One is shown in the photograph on page 144, at the extreme right near where Mr. Watanabe is standing. Most of the firethorn bonsai look a bit cheap,

but their orange fruits are nice. Americans have a wider selection of firethorns than we have—many old and new species and varieties to choose from. I venture to advise the novice to begin with firethorn, to get experience in training bonsai with burned copper wire.

The thick-barked form of Japanese black pine (*Pinus thunbergii*) is called *Nishiki-matsu*, or Nishiki-pine, and is very highly prized among bonsai fanciers. In the photograph of the collection of plants at the beginning of this article (page 144) two trees are shown at the left on the shelf in the background. One of these two is shown separately on page 151.

A certain percentage of the seedlings come true to the parent and are thick-barked. The photograph on page 152 shows a seedling trained in cascade style; it seems to me that it has lost balance on account of the highly developed bark. There is no hope of new branches from the slender part of the trunk, to say nothing of the thick-barked part. Some fanciers bury the whole of the slender trunk, up to the base of the thick-barked part, and plant it upright, as shown on page 151; that is the natural way and unquestionably the best way. However, the amateur enjoys his adventurous attempt; that is a weak point in one who



Japanese flowerin
apricot bonsai
(*Prunus mume*)
developed from a
old, nearly dead
trunk with young
vigorous shoots.

is interested in a thing that will take many years to complete, in this age in which many persons are tempted by speed.

The two bonsai of Nishiki-matsu on page 153 are not seedlings but are grafted on the ordinary Japanese black pine. When they were a year or so old, their trunks were cut off very short. After that, the stronger shoots have always been cut off or shortened and the weaker ones left. Cutting back induces the formation of side branches and keeps the trees very dwarf, so that they are suitable for miniature or *Mame bonsai* (pronounced "mah-

may bon-sigh"), grown in smaller containers.

Even when I saw fifty of these tiny Nishiki-matsu together, I could not find two alike, though they all seemed to be in the same style of training and trimming; however, the old-timer in pine bonsai could tell the owner or trainer of every one of them. It is often said, "If you will show me a bonsai, I will tell you the owner or trainer." As that great plant man of Long Island, Henry Hicks, has said in one of his old catalogs, "Plants are living things, not standardized merchandise that anybody can buy and sell."

Incidentally, I should think sweet gum (*Liquidambar styraciflua*) would be good for bonsai. The deeply furrowed bark of the trunk and the corky branches, which are conspicuous in the winter, should be much appreciated; also the persistent drooping fruit heads and the lustrous maplelike leaves.

Grasslike herbaceous plants, particularly rushes and reeds, are very popular as bonsai in the summer; they are not wanting on the amateur's shelves or in his house but are sometimes lacking in the connoisseur's collection. Some of the reasons are, I guess, that they are low in market value and that they do not need skilled techniques; but the fancier will not say so, if I ask him the

reason. (A man does not always tell everything.)

What attractive bonsai these grasslike plants make in the summer can be realized only by trying one or two.

To describe the virtues of rushes and reeds I cannot do better than quote the lines of Alice Meynell: "They are most sensitive to the stealthy breezes, and betray the passing of a wind that even the tree-tops know not of. . . . To the strong wind they bend, showing the silver of their sombre little tassels as fish show the silver of their sides turning in the pathless sea."

Common reed, or reed-grass (*Phragmites marina*, or *P. communis*), Japanese reed (*P. macer*), giant reed (*Arundo*

The thick-barked form of Japanese black pine is much admired by the Japanese.





Thick-barked form of Japanese black pine in cascade style. This tree lacks balance and grace but is an interesting experiment on the part of the amateur.

donax), eulalia, or silver-grass (*Miscanthus sinensis*), *M. japonicus*, and their garden varieties, and some other giant grasses are easily confined and kept dwarf for years. Old clumps may be collected in the wild or in the garden where someone has neglected dividing them; the older part should be selected, where the stems and leaves are short and slender. A clump of suitable size should be dug, with the clod firmly entangled with the roots. Any strong canes in the clump should be cut off. In giant reed, if a strong cane has one or two leaves at the lowest joints, it may be cut off only down to these leaves.

The old dead clump or the clod with entangled roots keeps its shape and holds

the soil firmly for years. This dead clump, with only a few tiny living parts, is really what the grass or reed bonsai will be growing on; but since reeds need a great deal of water, the clump or clod is placed in a basin filled with water as soon as it is dug and properly trimmed. The clump is kept in the basin of water and the plant will remain dwarf and be vigorous (though small in stature) for years, with only a little care which is easily mastered by the novice.

Common scouring-rush (*Equisetum hyemale*), Japanese sweet-flag (*Acorus gramineus*), and such herbaceous plants are grown in the same way or for similar effect.

Bamboos (*Bambusa*) are among the finest of the grasses for bonsai. There are numerous kinds of bamboo. Dwarf ones and those of medium size easily make fine bonsai in the way just described. One can dwarf a tall bamboo by peeling off the sheaths while the very young shoots are just coming up; a sheath may be taken off every day or less often according to the hardness and growth of the young cane.

If the upper part of a bamboo cane is cut off in early summer or midsummer, when it is approximately full-grown, it will become densely foliated the next year and be better-looking.

Group of bamboos (*Bambusa*) grown as bonsai.

E. Satomi



the long age of the civil wars in Japan the cults of nature-bonsai, flower arrangement, and tea ceremony became deep-rooted in average men and great heroes alike.

Then came the **Tokugawa Era**. Turning the leaves of old Japanese gardening books published in the seventeenth and eighteenth centuries, I often come across illustrations and descriptions of bonsai. From these I am convinced that the people of that time were very skillful in dwarfing and training plants and that they had great desire to find new kinds of plants that could be dwarfed successfully.

The accompanying photograph of winter daphne (*D. odora*) is reproduced from a book published in 1827; it shows a crested branch which was rooted as a cutting and perpetuated and trained as a bonsai.

The second photograph is reproduced from a book published in 1837. The first glance shows merely a completed bonsai; but closer inspection reveals that on each branch of the thread-form Sawara cypress (*Chamaecyparis pisifera filifera*) one to three scions of Hiba arbor-vitae, or false arbor-vitae (*Thujopsis dolabrata*), have been grafted. When the graft unions are completed, all the branches of Sawara cypress are to be cut off and the whole tree converted into Hiba arbor-vitae.

These are not childish attempts or vague ideas but are the products of long years of an age of military ascendancy, when every profession was hereditary—the time called the Tokugawa Era. In those wonderful long peaceful years, the Japanese people were accustomed to escape from daily life into something that interested them; they devoted their leisure time to things that freed them from the restraint of social life; they entered into friendly rivalry with their fellow fanciers or tried to surprise them in some way. Hence improvement, discovery, and skill in the art of bonsai were much advanced by amateur fanciers. When amateurs have their enthusiasm aroused, they are always without regard for the gain or loss im-

volved; that attitude greatly advanced bonsai.

Professional men have been interested only in seizing the cream of the amateurs' discoveries in ideas and in materials. Therefore I praise the amateur bonsai fanciers. In Japan there are nearly as many amateurs as bonsai trees. A large number of them are worthy of saying, as did G. K. Chesterton, "We wear proudly the name of amateur."

Example of an Amateur

As an example of an enthusiastic amateur bonsai fancier, I will tell you of a Mr. Watanabe of the city of Takamatsu, a place noted for bonsai and cage-bird fanciers.

Mr. Watanabe is a salaried man, past middle age. Since the time in his youth when he worked in the Takamatsu post office, he had been enthusiastic about bonsai as a hobby and had built up a varied and interesting collection. Then on a hot summer day in 1945 his house and all his collection were burned and completely destroyed by bombing. A few blank years passed. Gradually, relieving him from self-abandonment, his enthusiasm for bonsai revived and crept back into him. The accompanying photograph shows part of the result. Beyond the bonsai shelves can be seen a field of grass where dwelling houses once stood in rows. The only other visible sign of the influence of war is several rows of barbed wire encircling the bonsai to protect them from the mischief of passers-by. In taking the pictures I was very careful to keep the wire out of sight as much as possible. "Everybody has come back nearly to the standard of bygone days in clothes, but why not in morale and in taste?" he complained to me, not hatefully or scornfully, but regretfully.

The mental effect that force had, has remained in many cases. However, I have come across young men who are planning to gain refined taste and pleasure by growing bonsai. Some Americans living in Japan also seem to be attracted to bonsai "simply to waste time," as an



1827 print. See preceding page.

American Army Colonel said during a course of instruction on bonsai technique at the bonsaimen's. Doubtless a more serious purpose will be found in many Americans and people in other countries.

Spirit of Bonsai

An old-timer in bonsai (introduced to me by a friend) wrote me a story that has been enrent in his district for many decades. An American picked up a Japanese black pine bonsai and asked its price, of the farmer who raised it. When the satisfied American had gone nearly out of the gate, it occurred to the farmer that if he said that price was only for the tree, the buyer would pay a little more for the container. He hurried out and asked for the money for the container. On hearing the insatiable claim, the American pulled out the tree the farmer

had treasured and threw it to him, saying "I need only the container."

In telling me this story I think my friend has kindly warned me of the difficulty of making known the *spirit* of bonsai. Whether or not it is possible to convey the *spirit* of noble bonsai raised by worthy growers, it should be easy to describe the technique generally practiced in Japan and to transmit some appreciation of dwarfed trees. It should be possible for the culture of bonsai to be practiced and enjoyed in other countries, and to be adapted in one way or another to the life there.

Since we were beaten in the war and Americans have come in and shown interest in bonsai, some young Japanese bonsai growers are representing themselves as *artists* and bonsai raising as strictly an *art*. If this is so, it is not necessary to use the words "artist" and "art"! This is the last thing that comes to the amateur's mind. The amatenrs are generally far

1837 print. See preceding page.



cher in culture and talent than the men who cry out that they are artists of bonsai. Possibly the real *spirit* of the cult of bonsai is passed down from father to son, even though amateur bonsai fanciers often show amateurish and poor attempts at growing and training bonsai.

Kinds of Bonsai

There is a wide range of rank among bonsai. One can easily distinguish a mereotted plant from a noble old bonsai; but there are many gradations between the two and there is no strict rule to draw a line between them. Sometimes it is impossible to say which is which—as with the man and the pig in George Orwell's *Animal Farm*.

On mound of soil. The amateur's so-called amateurish efforts in attempting bonsai in unusual ways or according to his own ideas are always associated with his daily life, since reward in money is the least consideration to him; thus they give him endless pleasure, though they may seem childish to the orthodox grower. Such an attempt in Mr. Watanabe's collection is the seedlings of Japanese black pine grown on the mound of soil on an old tile. For a few years after he bombing, the ground in practically the whole city was covered with tiles like his one. The bonsai was started by sowing the pine seeds directly on the mound.

Ever since they were very young, the little trees have been cut back or pinched off repeatedly and severely, and their long needles cut in half. Now it looks very nice; and when it has grown only a few years more, no one could call it a childish effort—as he might do now without knowing the aim.

Various conifers and many other kinds of trees are grown and trained nicely in this novel way, starting from seed. In trying these one may pinch and cut back to his heart's content; for a man of discernment will find something to be treated with finger nail or shears almost every day in the course of a year.

It is often said that the best means of controlling temper is to sit down before one's favorite seedling bonsai-in-the-making and trim them to one's satisfaction. I know quite well that there is some truth in this, as I have thus disciplined myself sometimes. This shows that repeated and sometimes very deep cutting back are necessary, to make these seedlings dwarf and finely shaped.

The soil mixture and other materials to make the mound are an interesting problem. One must consider the nature and behavior of the trees sown in it and grown on it; the color, to harmonize with the surroundings; the shape of the mound; water-holding quality and drainage; sunshine, rainfall, wind, drought,

Japanese black pines (*Pinus thunbergi*) raised from seeds sown directly on a mound of soil on a tile.





First stage in development of bonsai from naturally dwarfed Japanese black pine collected on mountainside. Given time and proper training, this unlikely-looking attempt may become a fine example of the art of bonsai.

the degree of freezing of the climate, and other such elements. The soil formed by the entangling and decay of the fibrous roots of the resurrection plant (*Selaginella lepidophylla*) is often used in part or all of the mound.

Original design. Another amateurish attempt is shown in the photograph of the Japanese black pines in the shallow container. Climbing a mountain a few years ago, the amateur found several young pine trees of tempting shape and somewhat dwarfed naturally, and brought them home and tried them in an ambitious way. They still look like very poor things, but the grower is showing confidence in his attempt. How they will improve as they grow older remains to be seen: that is an interesting point in bonsai growing.

Miniature forest. The picture of Japanese white pine on the next page shows an orthodox method which Mr. Watanabe has started, a method of producing a many-trunked bonsai from one tree. Obtaining a small, well branched Japanese white pine tree from a nursery last year, he planted it in the shallow container, not in the normal way but with the trunk laid horizontally, most of its length just under the surface of the soil. The base of each branch is in the soil, the tip projecting

above the surface, as shown in the photograph. The new growth of the year looks very promising, to grow into nice trunk in years to come. On pages 155 and 156 are photographs of similar forms, more mature. Each of these photographs shows not many trees but the branches of a single tree.

I highly recommend this method to my American neighbors. All that is necessary is to pick out a few conifers or other trees from some nursery near home. This kind of bonsai is very easy to grow and manage, and it will not be long before a fine miniature forest is formed in the container.

Plants

Flowering trees. In the villages and hamlets in the mountains of Japan, near houses or on the borders of terraced cultivated lands, one often comes across of stunted trees of Japanese flowering apricot (*Prunus mume*), with trunks nearly rotten but with vigorous young shoots. In late winter or early spring the trees are smothered with blossoms.

Mr. Watanabe brought home one of those trees and trained it into a bonsai. He kept only part of the rotten trunk and cut off nearly all of the roots almost to the base, carefully keeping as many

Japanese white pine (*Pinus parviflora*) with the trunk in a horizontal position and uprightly covered with roots. When the branches develop they will form a many-trunked bonsai. See pages 155, 156, and 157.



the fibrous rootlets as he could. The result is shown in the photograph on the next page.

Soon after flowering is over, every root is cut back to two or three buds; from these buds new shoots will soon grow and replace the ones cut off. Cutting back is repeated every year after flowering. Whenever buds are formed so close to the trunk, very deep cutting back is practised in order to keep the tree dwarf in stature and to improve the artistic shape of the bonsai.

When I was young, I took home from my father's apple orchard some hollow and rotten-trunked trees, sawing them down to a height of $1\frac{1}{2}$ feet or so. I grew them for a season in the garden and then put them into containers. They were nice bonsai; I well remember that one of them was one of my proud possessions. Old orchards of deciduous fruit trees are rich and profitable places to procure materials for bonsai. Crab apple (page 194) and species of *Malus* used as stocks and found remaining in unproductive orchards may also provide suitable material.

Firethorn (*Pyracantha angustifolia*) is much used as a dwarfed potted shrub in Japan. One is shown in the photograph on page 144, at the extreme right near where Mr. Watanabe is standing. Most of the firethorn bonsai look a bit cheap,

but their orange fruits are nice. Americans have a wider selection of firethorns than we have—many old and new species and varieties to choose from. I venture to advise the novice to begin with firethorn, to get experience in training bonsai with burned copper wire.

The thick-barked form of Japanese black pine (*Pinus thunbergii*) is called *Nishiki-matsu*, or Nishiki-pine, and is very highly prized among bonsai fanciers. In the photograph of the collection of plants at the beginning of this article (page 144) two trees are shown at the left on the shelf in the background. One of these two is shown separately on page 151.

A certain percentage of the seedlings come true to the parent and are thick-barked. The photograph on page 152 shows a seedling trained in cascade style; it seems to me that it has lost balance on account of the highly developed bark. There is no hope of new branches from the slender part of the trunk, to say nothing of the thick-barked part. Some fanciers bury the whole of the slender trunk, up to the base of the thick-barked part, and plant it upright, as shown on page 151; that is the natural way and unquestionably the best way. However, the amateur enjoys his adventurous attempt; that is a weak point in one who



Japanese flowerin
a pricot bonsai
(*Prunus mume*)
developed from an
old, nearly dead
trunk with young
vigorous shoots.

is interested in a thing that will take many years to complete, in this age in which many persons are tempted by speed.

The two bonsai of Nishiki-matsu on page 153 are not seedlings but are grafted on the ordinary Japanese black pine. When they were a year or so old, their trunks were cut off very short. After that, the stronger shoots have always been cut off or shortened and the weaker ones left. Cutting back induces the formation of side branches and keeps the trees very dwarf, so that they are suitable for miniature or *Mame bonsai* (pronounced "mah-

may bon-sigh"), grown in smaller containers.

Even when I saw fifty of these tiny Nishiki-matsu together, I could not find two alike, though they all seemed to be in the same style of training and trimming; however, the old-timer in pine bonsai could tell the owner or trainer of every one of them. It is often said "If you will show me a bonsai, I will tell you the owner or trainer." As that great plantsman of Long Island, Henry Hicks, has said in one of his old catalogs, "Plants are living things, not standardized merchandise that anybody can buy and sell."

Incidentally, I should think sweet gum (*Liquidambar styraciflua*) would be good for bonsai. The deeply furrowed bark of the trunk and the corky branches, which are conspicuous in the winter, should be much appreciated; also the persistent drooping fruit heads and the lustrous maplelike leaves.

Grasslike herbaceous plants, particularly rushes and reeds, are very popular as bonsai in the summer; they are not wanting on the amateur's shelves or in his house but are sometimes lacking in the connoisseur's collection. Some of the reasons are, I guess, that they are low in market value and that they do not need skilled techniques; but the fancier will not say so, if I ask him the

reason. (A man does not always tell everything.)

What attractive bonsai these grasslike plants make in the summer can be realized only by trying one or two.

To describe the virtues of rushes and reeds I cannot do better than quote the lines of Alice Meynell: "They are most sensitive to the stealthy breezes, and betray the passing of a wind that even the tree-tops know not of. . . . To the strong wind they bend, showing the silver of their sombre little tassels as fish show the silver of their sides turning in the pathless sea."

Common reed, or reed-grass (*Phragmites maxima*, or *P. communis*), Japanese reed (*P. macer*), giant reed (*Arundo*

The thick-barked form of Japanese black pine is much admired by the Japanese.





Thick-barked form of Japanese black pine in cascade style. This tree lacks balance and grace but is an interesting experiment on the part of the amateur.

dona), eulalia, or silver-grass (*Miscanthus sinensis*), *M. japonicus*, and their garden varieties, and some other giant grasses are easily confined and kept dwarf for years. Old clumps may be collected in the wild or in the garden where someone has neglected dividing them; the older part should be selected, where the stems and leaves are short and slender. A clump of suitable size should be dug, with the clod firmly entangled with the roots. Any strong canes in the clump should be cut off. In giant reed, if a strong cane has one or two leaves at the lowest joints, it may be cut off only down to these leaves.

The old dead clump or the clod with entangled roots keeps its shape and holds

the soil firmly for years. This dead clump, with only a few tiny living parts, is really what the grass or reed bonsai will be growing on; but since reeds need a great deal of water, the clump or clod is placed in a basin filled with water as soon as it is dug and properly trimmed. The clump is kept in the basin of water and the plant will remain dwarf and be vigorous (though small in stature) for years, with only a little care which is easily mastered by the novice.

Common scouring-rush (*Equisetum hyemale*), Japanese sweet-flag (*Acorus gramineus*), and such herbaceous plants are grown in the same way or for similar effect.

Bamboos (*Bambusa*) are among the finest of the grasses for bonsai. There are numerous kinds of bamboo. Dwarf ones and those of medium size easily make fine bonsai in the way just described. One can dwarf a tall bamboo by peeling off the sheaths while the very young shoots are just coming up; a sheath may be taken off every day or less often according to the hardness and growth of the young cane.

If the upper part of a bamboo cane is cut off in early summer or midsummer, when it is approximately full-grown, it will become densely foliated the next year and be better-looking.

Group of bamboos (*Bambusa*) grown as bonsai.

E. Satomi



These two very dwarfed bonsai were developed by grafting the thick-barked form of Japanese black pine on the ordinary black pine.



Finished Bonsai

"Where can we get them?" will be the query to the commercial Japanese bonsai fancier and to the American fancier from those who are seeking the much-valued finished bonsai. However, such bonsai can be maintained in perfect condition or at a high standard only by a professional bonsaiman of long experience or a fancier who has spent time and money liberally for long years. One who has secured these bonsai by accident or by luck will be bothered and will find himself incessantly busy, trying to maintain them in perfect condition. They are really very fine things and worth the stated value, but they should be left to the man who can afford a yacht.

Plants to Begin With

There is a vast field of plants with which one may pioneer in bonsai culture or with which one may play, in the spirit of an amateur. There are, I think, numerous materials suitable for bonsai in the nurseries and on the mountains in America. If one only gathers a handful of seeds in the woods or somewhere, he can raise many nice bonsai in the course of a few years, as Mr. Watanabe has done with the seeds of Japanese black pine. Bald cypress (*Taxodium distichum*), birches (*Betula*), beeches (*Fagus*), pines (*Pinus*), tupelo, or sour gum (*Nyssa syl-*

vatica), sweet gum (*Liquidambar*), spruce (*Picea*), larch (*Larix*), Douglas-fir (*Pseudotsuga*), and many other American trees provide plenty of seeds to start with; or seedlings may be taken from the natural habitats in a way that will not damage the forest constitution.

I recall "Californian Jottings" by the Viscountess Byng of Vimy in the *Journal of the Royal Horticultural Society*. In her most interesting article she tells us: "Walking is an incomprehensible thing to the average American, and to their way of thinking you walk either because you have not got a car or because you are a mildly mental case." However, I have hope, because she adds a story of the experience of some of her friends: "They saw a man walking, and when they reached him found a placard on his back, 'I am walking, thank you.'"

Now if you walk in the mountains, you will occasionally find naturally dwarfed trees near mountain paths, on the cliffs of rocky coasts, ravines, and mountains, and on the peaks of mountains where eternal winds rule. These will be good materials to start with.

Give me to fashion a thing;

Give me to shape and mould;

I have found out the song I can sing,

I am happy, delivered, and bold.

—Laurence Binyon, *The Secret*.

OUTSTANDING PLANTS FOR BONSAI

Hints on their culture and training

Y. Saida and M. Saida

Sargent's Juniper

Juniperus chinensis sargentii is one of the very popular bonsai. Practically all the old bonsai of this tree are developed from specimens taken from their natural habitats by professional collectors, from the northern part of the so-called Japan Alps in West Middle Japan, from Iyo Province, from Hokkaido, and from other places where the tree grows.

Cuttings. Young bonsai of Sargent's juniper are raised from cuttings. Young shoots 2 to 3 inches long are taken, the lower leaves are cut off, and the cuttings are pared slightly on one side. These are inserted in a bed of clean

Sargent's juniper, a very popular plant for dwarfing.

sand, in the spring or in the autumn. In a few years they are ready to be trained and trimmed as bonsai.

Training. Wiring is best done in early spring. Pinching and trimming are done in May and June. Care must be taken not to destroy the natural form of Sargent's juniper, which is to have roundish compact growth on the main branches.

Fertilizer is given often in the spring and in the autumn; none in midsummer. A handful of rape cake or soybean cake* is placed on each of two or three spots on the soil in the container; or these fertilizers are fermented and applied in liquid form, greatly diluted. The liquid fertilizers are applied twice a week or so.

Sargent's juniper does not need much water.

Japanese White Pine

Pinus parviflora is another very popular bonsai tree. Many professional collectors of bonsai material risk great danger to obtain naturally dwarfed specimens from high cliffs, ravines, and desolate high mountains where these trees are in eternal struggle with the ravaging elements. The collecting is

*For readers who cannot obtain soy bean meal locally the Botanic Garden has obtained a supply which is available in quart size packages at cost plus packing and shipping: 50¢ east of the Mississippi River, 75¢ farther west. Larger package, \$1. Address Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn 25, New York.



A three-trunked Japanese white pine.



alone in Iyo Province of Shikoku, Echigo, Yamato, and in southern Japan.

If the soil is too rich, or if water is given liberally when the new growth is developing, the leaves become long and untidy.

It is necessary to pinch or cut off the new growth while it is young and soft, to maintain a shapely bonsai that will not be spindling. One may think the tall tree in the photograph is spindling and wonder if it became so because it was not pinched. The appearance of this tree is not the result of gradual dying of the branches from the lower to the upper, which is generally seen in trees poorly or wrongly treated and trained. This tree has been trained to this form from an artistic point of view, to achieve early parallel growth of three trunks.

The low and spreading Japanese white pine shown on the next page has several trunks from the soil. It is not

several trees growing together but is a single tree; this form of bonsai is called *Netsuranari* and is very fashionable; the trunks and roots are connected.

Clasping a Stone

The Yedo spruce shown on the next page and the Japanese white pine on page 157 are planted on stones—a style of bonsai tried by every bonsai fancier and called *Ishitsuki*, or plant clasping a stone.

In choosing a stone suitable for planting a tree or trees, several factors should be considered: for example, whether the stone has a concave surface in which the tree may be planted, and whether there are crevices in which the tree may be placed or along which the roots may be directed downward, finally to be anchored in a pocket in the stone or in the container. The stone must be stable in the container in all



A very shapely Japanese white pine with five trunks

cases. Not less to be considered is the color of the stone, to harmonize with the tree planted on it and with the surroundings in which it is to be placed for display. For the good of the tree, somewhat soft stones are preferred, and in some cases kinds that absorb water.

In planting trees on stones, the novice is likely to use bigger and older trees, but that does not always bring

Yeddo spruce (*Picea jezoensis*) trained to a picturesque shape; growing on a weathered stone.

good results. Very young trees are far better to begin with. The roots of the bigger and older trees are rather stunted and do not spread well on the stone or grow down into the soil in the container; but the roots of the little young trees spread vigorously in every direction and grow well. In a few years the young trees overtake the older ones but their growth is easily controlled and the trees kept dwarf because the trees themselves and most of their roots are on the stone.

The container in which the stone and tree are placed, with soil, is *not* a basin to hold water but is like the containers used for ordinary bonsai: it has holes in the bottom (generally two or so).

On the Yeddo spruce shown here on the stone, rather thick copper wires are coiled upward to bend the trunk; two are used on the lower part.

Miniature Forest

The miniature forest of Yeddo spruce (*Picea jezoensis*) shown on the opposite





A much-dwarfed Japanese white pine growing on a stone.

page was created from one tree. The trunk of a young, well branched tree was laid horizontally under the soil of the container. The bases of the branches were covered and their upper parts projected above the soil. In the course of years, roots came out from many parts of the buried trunk, and each branch became just like an independent trunk.

Japanese Zelkova

The photograph of *Zelkova serrata* (next page) shows the roots spreading on the surface, the same as in giant old trees; also the branches growing obliquely upward, as they do in old trees in nature. It is good taste to train the bonsai tree to be a model of the natural tree.

Pinching. As this tree grows well, and dense growth of twigs is much appreciated, repeated pinching of the young growth should not be neglected. If all the leaves are cut off in June, new

growth soon appears and becomes denser.

Soil. For other bonsai good drainage is essential; but if the soil for Japanese zelkova is too sandy, the branches are likely to die.

Fertilizers that are too strong encourage the growth of too vigorous shoots. Japanese zelkova is naturally a strong

Miniature forest of Yedo spruce developed from one tree by the method described on page 148.





The gray-barked-elm (*Zelkova serrata*), a native of Japan, makes a shapely dwarfed tree.

grower and so should have only very dilute liquid fertilizer.

Repotting should be done every other year. The tree is taken out of the shallow container; some of the soil is removed from the sides and bottom of the old soil clump, and the roots that are thus exposed are cut off. The tree is then repotted in the container, with new soil to replace what was removed.

Japanese-ivy

Boston-ivy (*Parthenocissus tricuspidata*) is native to Japan and China. Our autumn tints are due to this ivy in many

places, particularly on rocky cliffs, where it spreads thickly and clings firmly by tendrils with adhesive tips. It stands dust and soot well and so will make a good bonsai in the city. Although a climber in nature, it can easily be kept shrubby as wisteria can. The photograph shows how the plant should be trimmed.

Trident Maple

Maples are much appreciated for their young green foliage, for their autumn color, and in the winter for their well formed delicate branches, branchlets, and trunk.



Boston-ivy, or Japanese-ivy, kept in a shrubby form and grown as bonsai.

Trident maple responds well to culture as bonsai and displays good autumn colors.



The trident maple (*Acer buergerianum*, or *A. trifidum*) was introduced into Japan from China centuries ago. It is the one most frequently seen as bonsai. Tremendous numbers are grown because it responds well to trimming, has a tendency to form roots on the surface of the soil, produces dense growth with vigorous small neat leaves which are pleasing when young and in autumn colors, and has other virtues. As it grows very vigorously, shooting up quickly here and there, pinching must not be neglected, and continually repeated pinching is necessary, leaving two leaves on each shoot.

On the maple and on some other trees, *Hagari*, or cutting off the leaves, is practiced in our rainy season (mid-June to mid-July), when young shoots are beginning to harden. If all the leaves are cut off, the tree soon produces new ones, which will show brighter autumn colors than the old ones would.

Repotting. It is important to repot a maple each spring, taking off the old soil carefully and cutting off most of the roots produced in the last year. Thus it will grow nicely, yet remain dwarf, in the same container for years. With the less vigorous maples, the roots are cut less.



E. Satomi

Japanese flowering cherries are considered difficult to train as bonsai. Shown above is one of the many varieties of *Prunus subhirtella*.

Flowering Cherries

Japanese flowering cherries are so well known as to call for only brief mention. They are grown abundantly everywhere in Japan, but it is very *rare* to come across them as bonsai. According to general opinion, they are among the most difficult trees to grow as bonsai, and this

is strictly true except for a few experts who are always particularly fond of them.

Varieties. Many varieties are suitable for bonsai; only a few are not so good, such as KIRIN, with branches too stout, AMANOGAWA, with fastigiate growth, and a small number of others. There are many varieties familiar in foreign countries and better for bonsai, such as KANZAN



A carefully trained specimen of Japanese flowering cherry.

(SEKIYAMA), erect, with spreading branches and double deep rose-pink flowers; ITOKUKURI, with semidouble pale pink flowers prettily clustered; MURASAKI-ZAKURA, a nice slow grower with semi-double purplish pink flowers; HIZAKURA, the best grower, with lovely rose-pink flowers; *Prunus subhirtella pendula* [the weeping variety of rosebud cherry], with slender drooping branches; *P. subhirtella pendula plena rosea*, with flowers of deeper color; and the wild *P. serrulata spontanea*. Old dwarfed specimens of *P. incisa* are collected and grown as bonsai.

As Japanese flowering cherries bloom gorgeously and abundantly each year, they make the most colorful bonsai, if grown well. They do not grow in the city so well as in the country: they dislike dust and soot.

Training. I hasten to say that the burned copper wire so much used in the training of bonsai is taboo in the culture of Japanese flowering cherries; it should never be used in their training or put on them for any purpose. Anyone who ventures to use it on them finds that the branches soon die and consequently the tree becomes a sad sight.

The branches, roots, and rootlets must be cut very smoothly, with no ragged edges. Shears may be used; but some growers are careful to avoid using ordinary pruning shears and use Japanese razors and knives instead. If a root is damaged, it will die and rot just as quickly as a branch.

The curved trunk shown in the accompanying photograph was originally a side branch. It was carefully bent and



E. Satomi

Japanese flowering apricot is more frequently used for bonsai than flowering cherry. It is easier to train and the flowers are more in keeping with the dwarf size of the tree.

pulled down by means of a rope tied to it and fastened to the container when the branch was bent to the desired shape. The rope was kept on for months. A piece of cloth was placed on the branch where the rope touched it. Instead of cloth, hemp or Japanese paper or pieces of split bamboo are often used, for all kinds of bonsai; adhesive tape is harmful.

If three buds are formed at the tip of a branch, the middle one should be nipped off to make the tree grow as a dwarf and to prevent the dying of the smaller branches.

Repotting is best done in March, before the new growth starts. In repotting, very carefully wash off as much as possible of the old soil or as much as seems best for the tree. Cut off smoothly any rotten roots and some of the older ones. If, for one reason or another, you cut off a lot of the roots, be careful to reduce the branches in proportion, to keep the roots and top in balance.

The soil used is very porous; we bring it from the mountains. Stagnant water kills the roots of cherry tree bonsai and causes the plants to die.

Fertilizers are applied as to other bonsai—rape cake and the like.

Pests. Just as we favor flowering cherries, the insects are very fond of them, both in the air and in the soil. Beware of these.

Japanese Flowering Apricot

Prunus mume is a popular flowering tree for bonsai. Plants that are too floriferous or too gorgeously colored are rather avoided for bonsai. Japanese flowering apricot is not so gorgeous, however, as flowering cherries and flowering quince.

In flowering apricot bonsai the Japanese appreciate particularly the aged trunk and the one-year-old shoots fresh in pleasing green. When the flowering season comes, we like to have some blossoms on these shoots to perfume the room.



E. Satomi

A 400-year-old Japanese flowering apricot bonsai as it looks in winter.

This tree will grow in various soils and can stay in the same soil in the container for years.

In the growing season, particularly in the early half, liquid fertilizer should be applied several times. In the resting period, rape cake or soy bean cake should be placed on the soil. The container should be kept on the dry side until the flower buds for the next year are visible.

As we are bonsaimen, we have met many foreigners interested in bonsai at our Shuhō-en bonsai-growing and sales-yard in Tokyo. We hope the brief descriptions given here will give some helpful hints to friends in other countries who may wish to grow dwarfed potted trees, or bonsai.

TRANSPLANTING SARGENT'S JUNIPER BONSAI

The proper way to repot a popular kind of bonsai

Eikichi Satomi

The best time of the year for transplanting Sargent's juniper bonsai is either autumn or early spring, when the tree is dormant.



The plant is gently removed from the pot. A mass of fibrous roots binds the soil into a compact ball.



One quarter to one third of the soil at the outer part of the ball is carefully removed, exposing the roots.

In Japan hard pellets of clay containing no organic particles or fertilizer are used for potting Sargent's juniper; but in America clay aggregated by Krilium or other soil conditioners is recommended. Powdered clay soils would not be satisfactory. It is also necessary to avoid loams and materials containing any appreciable amounts of organic matter.*

*For some trees other kinds of soil are used. For example, sand may be mixed with the clay for planting pines; sandy loam may be used for zelkovas; and so on. This is dealt with in the articles on other kinds of bonsai.



The exposed fibrous roots are trimmed off to the surface of the remaining ball of soil.

Coarse pellets of clay or other materials of gravel size are placed in the bottom of the pot.



The tree is replaced in the pot, which is then filled with the smaller pellets of clay or the Kirilium-treated clay soil. The soil should be rather dry, and should fill the pot uniformly, avoiding air spaces.





The surface of the soil is firmed and smoothed with trowel and brush.



Immediately after planting, the soil is sprayed until water flows out of the drainage hole of the pot.

For a few days, until the plant has recovered from the shock of transplanting, it must be protected from direct sun and strong wind by being placed under a screen or other shelter.



This revolving stand will be recognized by most readers as a "lazy Susan"; it facilitates turning bonsai containers during transplanting or training.

FOR BONSAI BEGINNERS

Problems encountered by novices, and what to do about them

Kan Yashiroda

Bonsai for Enduring Interest

I AM not a young man—59 years; I want to start with some interest that will hold throughout the rest of my life, and in my introduction to bonsai trees I feel sure I have found it.

When a Japanese speaks thus to other Japanese, he is very often told he is growing old, in a cynical tone—or is it an utterance of envy? Be it cynicism or envy or anything else, he is entering into a pleasant continual activity in growing and training bonsai, and at the same time doing something good for his health, to keep him mentally alert and physically sound. He is not entering upon the pursuit "simply to waste time."

The author of one of the articles in this issue (page 183) is an actor by profession, like the man who expressed the above conviction; similarly, too, he lives in a big city. If this man will follow the example of the Japanese actor, he can grow, train, and enjoy many miniature bonsai in his New York apartment, in his two very tiny glass houses, one holding twenty-four 2-inch pots and the other, thirty-eight. Mr. Nakamura grows all of his miniature bonsai on shelves on the roof of his house in Tokyo.

Again and again in Japan one comes across a moving van piled with goods and chattels and carrying on the top some bonsai, which are troublesome goods to move. In many cases those bonsai are not worth a dollar in money; but the owner will tell you that he has



The author, holding two miniature bonsai.

cherished this one for the last fifteen years, that he collected that one on Mt. So-and-so and has kept it in the same container for thirty years, and so on. Enduring beauty and renewed interest in training and trimming those bonsai every year enchant him indefinitely.



E. Satomi photos

Fifty-year-old Japanese beech (*Fagus crenata*) growing over a stone, with roots extending into the soil.



Trident maple (*Acer buergerianum*) with its aged roots clasping a rock.





E. Satomi

Japanese yew bonsai (*Taxus cuspidata*). See next page for directions on proper placing of tree in oblong container.

Containers

Should the eventual container have a drain hole?

All containers have one or more drain holes; otherwise the trees will not be healthy but will look sickly and finally die. If you think bonsai should be somewhat sickly or stunted, you have not the right conception of real bonsai. Bonsai must always be healthy, though kept dwarf by some means; never forget that.

A basin (for holding water) is a different thing, used for a different purpose.

It is never used for growing bonsai directly. Old dead clumps with grasses and rushes growing on them are placed in basins of water (page 152). If you have a tree that does well in soil saturated with moisture, such as bald cypress (page 198), you may place the container in which it is growing in a basin of water. Bonsai trees growing on stones are sometimes put into basins of water; but many such trees have their roots spread into soil in the containers, as shown on the opposite page; these containers are the regular ones with drain holes.



E. Satomi

180-year-old flowering apricot (*Prunus mume*). This venerable bonsai spent its first 120 years in a garden and is now in its 60th year in a pot.

What proportion between tree and container do you advise?

What is generally considered the ideal or artistic proportion is the tree 80 per cent and the container 20 per cent; or for dwarfer shrubs or low spreading trees, the plant 60 per cent and the container 40 per cent. In general, the smaller containers are better.

In a shallow oblong or elliptical container, the tree should be planted at a point 70 per cent of the distance from the right or the left end, according to the spread and shape of the branches, as shown on the preceding page. In a square or round container, the plant is placed in the center, except cascade forms; these are planted toward the edge, as illustrated on page 172.



E. Satomi

Flowering apricot. When containers are square or round, the trees are placed approximately in the center.

Root Pruning

I have tried everywhere to obtain more information on bonsai. The chief information one gets here is root pruning.

Root pruning is *not* the most important element in dwarfing bonsai. The fundamental virtue in root pruning is to keep bonsai healthy in the limited dimensions of the container by replacing old roots with new ones.

Do not root-prune too much at a time or cut back too far on one or more strong roots: that stimulates the tree too much and causes too strong growth. The strong new branches will have coarser leaves and will weaken the branches that are smaller and older but important for the artistic shape of the tree.

Whenever repotting is done root pruning is necessary, to stimulate the formation of healthy fibrous roots.



E. Satomi

Cascade-style Japanese white pine (*Pinus parviflora*). Even in round containers, trees trained in this style are planted toward the edge.

I procured ten specimens of Colorado blue spruce (*Picea pungens glauca*) two years old, which had been transplanted twice. They were about 8 to 10 inches tall, with a good root structure. I obtained them in the fall and put them into 4-inch pots, but none of them survived the winter. What was the cause of the failure?

I think you pruned off many roots in order to plant the trees in 4-inch pots, and there was not enough time for the formation of new rootlets before winter came.

If you cannot wait until spring, prune lightly and pot early in the fall to give ample time for new root formation.

Still better, plant in slightly larger

pots than the ones in which you desire to grow and train the trees; the following spring or early fall, prune the roots and shift into the smaller pots.

It is a general rule that whenever ordinary nursery-grown stocks are intended for bonsai, they are first kept in a specially prepared bed for a year or more; there they are given some preliminary training with burned copper wire or other materials. Then they are shifted into containers, larger ones at first, smaller ones finally.

Another way is to plant nursery-grown trees in larger pots than one thinks necessary, and gradually shift them into smaller and smaller ones over a period of several years.

Thirty-year-old Japanese white pine in center of round container.



E. Satomi

Here in America there is a growing interest in bonsai. Three or four mail order houses are selling courses in the method of training; all of them give the same information, which is to prune away a third of the roots and then cut back the rest a fourth. This, I think, is one of the reasons why many of the trees shown here have leaves out of proportion.

Not yet having had occasion to visit America, it is hard for me to say whether such root pruning causes the disproportionate leaves. It may be one of the reasons (see page 171). From what you say I get the impression that American bonsai growers or instructors are intend-

ing to have mass production of bonsai, disregarding the wise words of Henry Hicks: "Plants are . . . not standardized merchandise that anybody can buy and sell."

Recently I saw Charlie Chaplin on the screen in "Limelight." He showed with a gesture for a metaphor how Japan's pine trees are shaped. Japan's pine trees have struggled against the forces of nature and survived, as men have struggled for centuries in the spiritual and artistic winds and have lived through, preserving a little bit of our own culture. The art of bonsai is one of the things produced by a combination of these plants and these men—taken out of the melting pot.



Certain strains of Japanese maple have small leaves which make them especially desirable as bonsai. This specimen is 80 years old.

E. Satomi

Leaves Out of Proportion

Is there any way to avoid having the leaves out of proportion with the size of the dwarfed tree?

Reduction in size of leaves does not usually parallel the degree of the dwarfing of the tree: in the course of dwarfing, the leaves show little evidence of becoming smaller.

We select smaller-leaved varieties or clones for bonsai in the first place. Many trees used as bonsai have shorter- or smaller-leaved varieties or clones in one district or another; this is true of Japanese zelkova (*Z. serrata*), beeches (*Fagus*), elms (*Ulmus*), Japanese white and black pines (*Pinus parviflora* and *thunbergii*), Sargent's juniper (*Juniperus chinensis sargentii*), Yeddo spruce (*Picea jezoensis*), and many other trees.

One may think that such a problem

does not concern needle-leaved trees; but Japanese bonsai fanciers recognize several clones or strains of the trees mentioned above, and are careful to secure their material from the particular district in which the desired clone or strain grows naturally. I cannot describe the distinctions scientifically, but I can clearly identify the different clones or strains at a glance.

In American trees, also, a keen observer with artistic taste in color and form may find some clone or strain which botanists do not consider worth separating but which is more suitable for bonsai. The distinction may be a minor one; but when these trees are grown as bonsai, it is the minor distinction that makes one tree predominate over its fellows.

Trees that have been cultivated for centuries have many varieties and forms,

and generally some of these are smaller-leaved or dwarfer in nature. Many varieties will to some extent do away with the complaint of the disproportionately large size of the leaves when the trees are dwarfed. Such varieties exist particularly in Japanese maples (*Acer*), heavenly-bamboo (*Nandina domestica*), pomegranate (*Punica granatum*), magnolias, camellias (*C. japonica* and *C. sasanqua*), Kurume and Satsuki azaleas (*Rhododendron obtusum amoenum* and *R. indicum*), Japanese flowering apricot (*Prunus mume*), and flowering quinces (*Chaenomeles*).

In certain kinds of broad-leaved trees, sometimes all the leaves are pinched off when they are practically mature. This causes new leaves to be formed which are smaller and which will be brighter in autumn color in such trees as trident maple (*Acer buergerianum*) and other maples.

In other cases, the growing branches are cut back to dormant buds to induce these to become active, and the resultant leaves may be smaller. The new sprouts are regulated by pinching the strongest ones off entirely or reducing them to one or two leaves; then a third sprouting, with smaller leaves, may be expected from the axillary buds or dormant buds.

The leaves of bonsai are healthier,

brighter, and neater in appearance when the plants are kept in a sunny site, are not allowed to become water-logged, and are properly fertilized. It would not be a good idea to give no fertilizer at all or to use a fertilizer without nitrogen.

When the size of the leaves is incomensurate with the size of the tree from an aesthetic point of view, thinning of leaves is practiced; this relieves the feeling of disproportionateness.

Whenever large broad-leaved trees are trained as bonsai, the branches are greatly reduced; with a few branches the bonsai is formed into an artistic shape and the place each leaf fills is carefully considered. In other words, when the leaves are fully expanded, each leaf takes the place of a branch from the aesthetic point of view; and so the leaves do not seem out of proportion.

In Japan one often sees pine needles cut in half to remedy an untidy appearance; but this does not look so nice, and I have never wished to try it, myself.

Thinning the needles, taking off the older ones on each shoot to relieve the heavy feeling, and shortening the needles by cutting off the upper half or so, are general practices with pines in Japanese gardens and as bonsai.

Kurume azalea
(*Rhododendron obtusum amoenum*),
with small leaves.



Water

Should one deprive the little trees of as much water as possible?

Bonsai should be kept drier than ordinary ornamental plants in pots; but if the object is to dwarf the trees or to keep them dwarf, it is no use to make them bone-dry. Want of water only makes them stunted or unhealthy.

If there is such a thing as a fundamental principle in watering bonsai, it is this: water liberally but be sure that the soil drains amply. In most cases, it does not matter how many times a day bonsai are watered if the soil has perfect drainage and does not hold the slightest excess of water. This explains why many bonsai growers are kept busy with watering, particularly in hot dry weather; and why bonsai kept outdoors are never water-logged even in the rainy season in Japan, though the rain pours down day after day.

This fundamental principle may be modified to suit the individual case, according to the kind of soil obtainable, the climate, the kinds of trees grown,

the containers used, and the amount of time one can spare each day for bonsai.

Black and red pines trained as bonsai in the districts around the Seto Inland Sea, where the climate is sunny and dry, generally become longer-needed when brought to Tokyo or thereabouts; the reason is that it is less sunny and the air contains more moisture.

I once told a New Yorker: "If New York's air is saturated with spirits (as an American lady in Italy said) or saturated with any other moisture, you must always keep your containers drier than usual. If you keep them on the wet side, the leaves will be in hopeless condition—large, thin, and untidy."

The New Yorker has corrected my view by saying: "The only thing that saturates this city's air is dirt and soot." Dirt and soot are also troublesome and dangerous to bonsai. Unless the leaves are always kept clean, the branches become weak; gradually the smaller and weaker ones die, leaving only the upper, stronger ones and the bonsai become spindly and unsightly.

Louis Buhle



A Japanese white pine bonsai on which the wires have been painted white to make them show in the photograph.

A 10-year-old Yeddo spruce (*Picea jezoensis*) showing how the wires are placed for training.



Wiring

How is the tree trained with wire?

The accompanying photograph shows the way better than I can describe it.

The amount of water given daily should be reduced for two or three days before the operation takes place; this puts the tree into better condition for the wiring by making it somewhat limp and pliable.

Copper wire is prepared for use by being burned in a fire. In Japan a rice-straw fire is always used because it does not become too hot; wire thus burned (and cooled) is very flexible but still just as durable as before. If the wire is burned too long in a fire that is too hot, it becomes dry, brittle, and difficult to coil. Therefore if any other fuel than rice straw is used, the copper wire must

be carefully watched; it should be taken out of the fire as soon as it glows and shows a blue flame; it should then be put into water immediately.

One end of the burned copper wire is inserted deep into the soil near the base of the trunk to be trained. It is then coiled upward but not in firm contact with the trunk or branches. To avoid damaging the bark or leaving the marks of the wire on it, the trunk is often covered with hemp bark before the wire is coiled. The bark of a cryptomeria tree, rice straw, pieces of split bamboo, and the like may be used in place of hemp bark. For delicate and soft-barked trees and shrubs such as azaleas, the wire is covered with cloth, Japanese paper, and the like, before it is used.



Author drawing

Left, an upright azalea. *Right*, the same azalea bent into a curve and held in position with copper training wire.

The photograph on the previous page shows a 10-year-old Yeddo spruce (*Picea jezoensis*); just before the buds opened, the branches were thinned and the trunk and branches were trained with wires.

When the coiling is finished, the bending begins. Holding the base of the trunk in the left hand and the upper end of the wire in the right, bend the trunk into approximately the desired position. Then make the more minute and delicate bends, one by one. The training of the branches follows.

This technique is suitable for slender trunks and small branches. With stouter trunks, bending must precede wire coiling.

One could easily take the upper half of the trunk of the tree in the photograph, and bend it horizontally in a moment. The principle of wire-coiling, however, is that after the trunk is bent into the desired shape with the hands—very cautiously and patiently—wire coiling follows to fix the trunk in that shape.

Whenever the trunk has once been bent, it *must not* be restored to its former position but must be held in the bent position until the wire coiling is finished to fix it that way. If a thick trunk or branch is bent sharply, the soft inner tissues on the outer (or convex) side of the curve are greatly damaged; but similar tissues on the inner (or concave) side of the curve are uninjured and continue to function and promote the healing of the damaged part. However, if the trunk is restored to its former position after it is once bent, all the inner tissues are likely to be damaged so that the tree will die.

Let me repeat: before bending or wiring, the trunk or branch should be protected with hemp-palm rope, manila rope, cloth, bark, or the like; raffia will do for very slender branches.

For a very thick trunk, which cannot be trained with wires, the expert uses a vise; but that is not good for the tree.

An azalea grown upright in a nursery

Mr. Hinone (*left*), is a veteran trainer of dwarfed trees. Here Mr. Hinone is meeting aspiring young students of bonsai in the public hall of Kinashi, Japan, to teach them the technique. Previously it was the custom for father to teach son.



row, like the one in the sketch, or any azalea with its branches thinned till it looked like this, could easily be trained into the curve shown in the sketch in an hour or two. Azaleas grown in greenhouses are better for training.

Winter Care

What do I need to know about winter care?

Pines (*Pinus*), Sargent's juniper (*Juniperus chinensis sargentii*), Yeddo spruce (*Picea jezoensis*), Japanese yew (*Taxus cuspidata*), Hinoki cypress (*Chamaecyparis obtusa*), and such trees growing naturally in northern Japan, are very vigorous in the winter as bonsai and have bright foliage. These trees do not need any particular winter care or protection. However, in severe cold the roots are often damaged and the containers broken; and so the containers should be covered with straw or some such material or the bonsai should be moved into the house. Even then it is better for them to be exposed to the sun and open air sometimes.

The roots of evergreens come into active growth before spring; hence watering should not be neglected. Since the evergreens are exposed to the wind and the midday sun, syringing is good to keep

them from drying and to clean the foliage.

Cryptomeria, needle juniper (*Juniperus rigida*), and such Japanese trees, not perfectly hardy on Long Island, should be brought into the house. Cryptomeria needs care because the foliage turns brown if it is exposed to the winter sun.

Bamboo (*Bambusa*), wisterias, Japanese flowering apricot (*Prunus mume*), azaleas, camellias, and other flowering trees and shrubs are less tolerant of cold and are somewhat active in the winter, and so they should be protected. They must not be allowed to lack water; and on sunny days, syringing of the foliage is good.

Deciduous trees and shrubs should be exposed to wind and cold, to prevent too vigorous growth of foliage in the spring. All watering should be done not later than two o'clock in the afternoon. If watering is delayed and much water remains in the container, the roots may be damaged and the container broken if the night becomes very cold.

The basins in which the clumps of reeds and rushes are grown (page 152) should be emptied of water. The clumps should be kept in the house (in or out of the basins) and given a little water.

Kinds of Plants

What kinds of small trees or shrubs might I buy at a nursery that could be grown in pots and trained as bonsai?

The other articles in this issue may well answer this question.

It is not necessary to have the dense, symmetrically branched young trees which are nice for foundation planting. Young trees irregularly branched but not stunted, having a broadly pyramidal outline, generally suit the purpose well enough. In other words, it is preferable to have a very stout or the stoutest branch at the base, and one nearly as stout, or equally so next above the base. If the lowest branches are not the stout-

est, they will become weakened in the course of years of dwarfing and will eventually be in very poor condition or die. Thus the tree will lose its good proportions and aesthetic shape and become top-heavy and spindly.

Opposite branching is avoided in bonsai. However, when young trees are selected for training, it is not necessary to avoid the opposite-branched ones; these can be changed into alternate-branched trees by cutting off one of the two opposite branches.

In the nursery rows, one should select young trees that have been well transplanted and root-pruned, especially those with spreading shallow roots, which are better suited to shallow containers. Trees



The spirit of bonsai is well portrayed by this Japanese maple (*Acer palmatum*). An ancient tree growing in nature would have the same gnarled limbs and roots left bare by soil erosion.

E. Satomi

Gray-barked elm, or
Japanese zelkova (*Z. serrata*).



E. Satomi

having some stout roots near the surface of the soil are easier to keep dwarf and healthy. The roots and rootlets in the lower part of the container can easily be renewed; and bonsai of certain trees, such as maples (*Acer*) and Japanese zelkova (*Z. serrata*), feature roots on the surface of the soil, as shown here.

For making a miniature forest from one tree, as shown on pages 142, 157, and 214, avoid a young tree with stout lower branches and choose one with branches as nearly as possible equal in vigor and length. The latter is more likely to produce uniform growth of the branches which are eventually to look like independent trees.

Aside from restraining the roots in a small container, what do you advise to dwarf Canary Island date palms (*Phoenix canariensis*)?

I am growing, in my Acclimatization Garden, some tall trees of palms—date palm (*Phoenix*), coconut (*Cocos*), Washington palm (*Washingtonia*), palmetto (*Sabal*), and some others. From seeds which have fallen from these palms, seedlings are growing naturally and abundantly, thousands of them close together. Seedlings growing thus show very little development, except those at the margin of the colony; yet I have never seen any dwarfed one worth cultivating.



Windmill palm (*Trachycarpus fortunei*) is one of the few palms suitable for bonsai

The only palm I have come across which is worthy to be called bonsai is the windmill palm (*Trachycarpus fortunei*). The photograph shows a number of plants in a shallow container, from my deceased uncle's collection. The

palms have been in the same container not less than twenty-five years and show no increase in size. Why, I do not know.

Zamias, from tropical America, will make a similar bonsai, as they grow very slowly in pots.



E. Satomi

Tools used in bonsai culture include small special knives, various scissors, pincers, and clippers.

Mr. Nakamura and part of his collection of bonsai and some of the tiny containers in which he grows them.



MINIATURE BONSAI

How to raise and enjoy them

Zeko Nakamura*

FOR the past twenty years I have been growing and enjoying miniature dwarfed potted plants, or *Mame bonsai*, as a hobby. I have endeavored to create ever smaller miniature bonsai, in smaller pots than have ever been used before. Indeed, I am growing these plants with the minimum amount of soil in the smallest pots in which they can live.

Water. The main point is that they are given plenty of water: in the summer they are watered about five or six

times a day; and even in the winter, they must be watered once a day by all means.

Soil. Since a great deal of water is applied, it is essential that the soil be well drained. Fine copper wire netting is placed over the hole in the bottom of the pot, for perfect drainage; this is covered by a layer of soil with particles the size of grains of rice; finally the pot is filled with soil having finer particles (the size of grains of millet). Both of these soils consist of a mixture of equal amounts of red clay subsoil and fertilized topsoil. These well sieved granulated soils allow good drainage and never hold excessive water. Even when water is given every thirty minutes, it runs through the hole immediately, and so the soil is kept sweet and well aerated. The soil may be sterilized before use, to destroy insects and disease-producing organisms. When I bring soil home, I sieve it into three or four grades according to size of particles and expose it to the sun for several days until it is smooth and dry as sand.

*The writer's name is well known among Japanese as a comedian on stage and sereen, but his hobby of miniature, or *Mame*, bonsai is known only among professional and amateur fanciers of bonsai. Having no garden space, he is growing all his hundreds of miniature bonsai on the roof, as is often done in a big city like Tokyo. While he was a young priest in southern Japan, where he was born, he was interested in growing the plants found on the mountains and in the fields around the temple. That interest was intensified on his return to secular life and grew to the maximum when he went to live in the big city. This is the first time he has ever taken his pen in hand to write on the growing and training of *Mame* Bonsai (pronounced *mah-may bon-sigh*)—Guest Ed.



Some of the writer's miniature bonsai brought indoors and arranged.

Potting. Before putting the plant into the pot, the root system should be examined and the older roots removed. One should then see which side of the plant is best to face the spectator. If a rectangular or elliptical container is used, the tree should be planted toward one end, the right or the left end according to the shape of the tree; in either case it should be placed at a point seven-tenths of the distance from one end and just back of the middle. That is the best spot, not only from an aesthetic point of view, but for trimming, training, and developing the plant.

The plant should be watered as soon as it is potted. For a week or so, the pot should be kept in half-shade and the foliage sprayed freely; then it should be placed in the sun half of the day for four or five days, and after that, exposed to the sun all day.

Fertilizer. I make my own fertilizer, of dried fish. I pulverize the fish, add water, and keep it in a covered jar for half a year or a year or more. Then I use the clear liquid in the upper part of the jar, diluting it fifty to 100 times.

†These fertilizers have been manufactured and sold for centuries in Japan and are among the most extensively used fertilizers for field crops, vegetables, and fruit trees.—Guest Ed.

Rape cake, soy bean cake, and herring cake are equally good.† Fertilizer should be applied to miniature bonsai generally once a week.

As Mame bonsai are wee lovely things, often displayed in the living room and admired in the palm of the hand, these fertilizers should not be placed on the surface of the soil but should be applied only in liquid form. The liquid fertilizer is made as just described and diluted as mentioned or diluted until the liquid is without smell or only very slightly odorous.

Containers. By comparison with the ordinary, larger bonsai, Mame bonsai are lacking in grand appearance; and so

Some of the writer's miniature





Display. Cigarette packages among plants give an idea of their size.

I train them to look like the larger bonsai or like the mature big trees. Also I prefer to use pretty pots or pans or containers, as this ornamental earthenware is in itself greatly to be admired. In the prewar days, I used to make and bake the containers at the pottery; but those and other containers, as well as all of my plants, were turned into ashes when my house was burned by a bombing during the war. My present collection of Mame bonsai and containers, as seen in the accompanying photographs, has been made and grown since peace has come to us.

Length of life. Unless one is careless, miniature bonsai will not die; they may

live through three generations of man—grandfather, father, and son. Some trees which are $1\frac{1}{4}$ inches tall when full-grown will live through several decades if well cared for. In my twenty years of growing several hundred of these tiny trees, I do not remember that one has died because of any fault in watering, fertilizing, or other care. I am always amazed to hear of the death of such plants.

General care. Since Mame bonsai are very little things, some fanciers say that it is better to grow them indoors or under bamboo blinds or in half-shade or in a cold frame, but I think it is better to grow them in full sunlight and exposed to all changes of season.

Except when I am afraid they might be blown away by strong winds, I keep them outdoors on the growing shelf all the time, even in the cold season. However, in Tokyo, if the plants remain outdoors in January, February, and March, the containers are often broken by freezing; and so they are brought indoors for these three months.

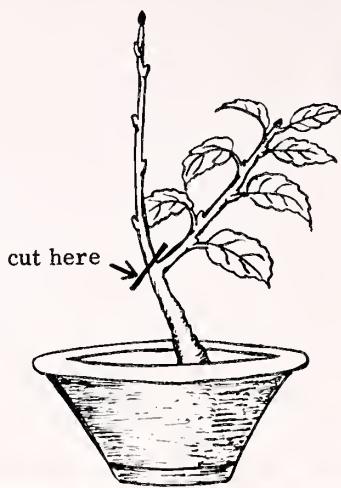
Some Mame bonsai, growing in larger containers, pass the whole winter outdoors without having their containers broken, though they are occasionally covered with snow and severe frosts are experienced every day. In such cases the growth in the spring is finer.

owing on the roof of his house.





一歳の実生



二歳

One-year-old seedling, ready for pruning to shape its trunk.

Frank Okamura, adapted from author's diagrams

Two year old seedling. Note upright shoot removed, lateral branch allowed to grow.

On windy days and on hot summer days, when the moisture is quickly dried out of the tiny containers, ice is given liberally. On some summer days when I was on the stage of a theater in the center of Tokyo, I took advantage of an hour and a half between two of my acts and went home, $3\frac{1}{2}$ miles away, to give ice to each of my little plants. Now, when I am often away from home for months, my mother, wife, and children take care of my plants with interest and pleasure; and so I have no fear of losing any of my Mame bonsai.

Subjective value. Next to motion pictures and plays, with which I am professionally concerned, I seem to be living for Mame bonsai. Whenever I am at leisure here and there in Japan, I search for naturally dwarfed small things suitable for this kind of culture. I bring them home, plant them in containers, and grow and train them as nice Mame bonsai. Raising miniatures from such natural material, or from seeds I sow myself, or

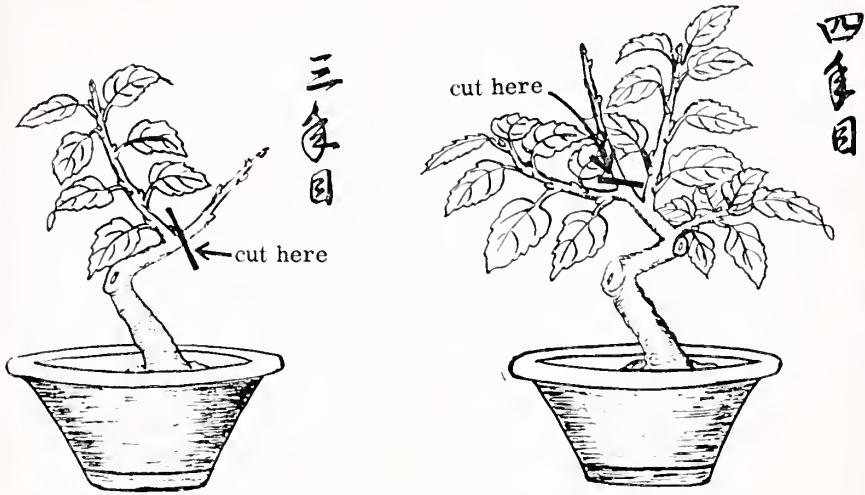
from material obtained by air-layering bigger trees, is far more satisfying than spending money for materials or purchasing Mame bonsai to admire.

It takes five to ten years to produce a Mame bonsai worthy of the name or fit to be admired. Indeed, it is a trial of patience between man and tree. It seems to me that this pursuit is good for hasty men in big cities in this hurried age; I feel that such impatient men learn to be deliberate as they become interested in raising Mame bonsai. In the course of growing and training these miniatures for years, a great deal of pleasure and satisfaction should be experienced.

Training

Now let me tell you the way to trim and train Mame bonsai.

Like nature. The best style for them is to follow the nature of the materials used. They should be miniatures of Nature's giants. A miniature bonsai of a large-growing tree is trimmed like the



Three-year-old tree, showing further training by pruning.

Four-year-old tree; trunk beginning to assume picturesque form.

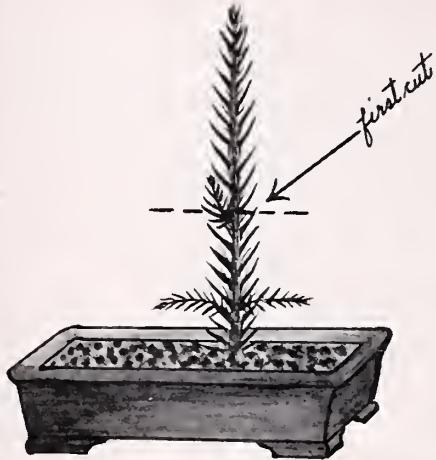
mature shape of that kind of tree, though of course it is far smaller in size. Mame bonsai shrubs are like mature shrubs in shape and style; and Mame bonsai herbaceous plants are like herbaceous clumps in miniature. Thus, Japanese zelkova is broom-shape, cryptomeria is columnar, and pines are in the shapes characteristic of old specimens.

If the habit of a certain tree is to have a straight vertical trunk, the material selected for Mame bonsai of this tree should be young straight-growing ones. If another has, in nature, thick roots spreading in all directions on the ground, the young tree selected should have its taproot cut off short so that it will have good development of roots on the surface in the future.

Wiring and pruning. The trunk is trained with copper wire which has been previously burned in the fire to make it more easily managed. However, it is impossible to train young trees 1 to 2 inches tall with copper wire at an early

age. Therefore a 1- or 2-year-old tree should be cut off at a dormant bud $\frac{3}{8}$ to $\frac{3}{4}$ inch from the base; after one or two years more it should be cut off an inch or so from the base. After such cutting back has been repeated for four or five years, the trunk gradually becomes interesting, looking like an old dwarfed one. Some tiny branches are formed very low; the lowest one should be kept longest and the uppermost, shortest; they are pinched back with the finger nails while they are very young. The manner of cutting back the leader to form a very dwarfed and interestingly shaped trunk is shown in the accompanying sketches.

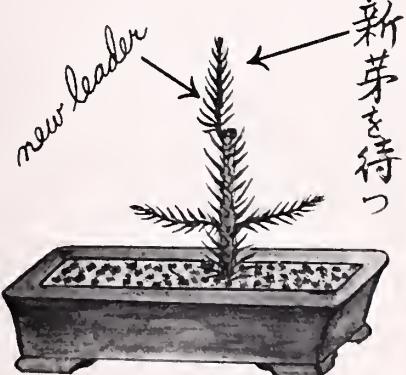
In contrast with the one illustrated here, cryptomeria is straight-trunked in nature and shows its maximum beauty in that form. The trunk of cryptomeria is repeatedly cut back year after year, to make it shorter and thicker, to have branches as low as possible, and to keep them healthy. If the trunk becomes bent



Young cryptomeria, showing where the leader is to be cut to keep tree dwarfed.

or twisted, copper wire should be coiled spirally around it from the base up, as shown in the sketch. The trunk can then be straightened, and the wire kept on until the trunk is fixed in the right

New leader developing from small branch just below first cut.

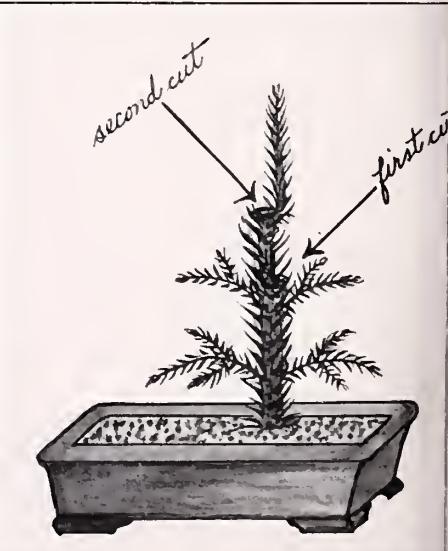


shape and position. Copper wire burned in a fire of rice straw is most easily managed and best to use for training.

Cryptomeria japonica is one of the most valued timber conifers in Japan. Two specimens are shown in the accompanying photograph. The smaller one is only $1\frac{3}{4}$ inches tall, while the other is $1\frac{4}{5}$ inches tall. The smaller one is the parent tree, 10 years old, from one of whose branches the bigger one was raised as a cutting taken two years ago and potted last year. Next year, in the spring, this young tree will be cut off about $1\frac{1}{8}$ to $1\frac{1}{4}$ inches from the base; it will be gradually dwarfed, being placed in smaller containers year after year until it becomes a Mame bonsai. In the course of dwarfing, particularly, and also afterward, it will be pinched with the finger nails.

A second cut has been made, on the new leader, and a third leader is developing. This procedure, repeated year after year, keeps the tree dwarf.

Frank Okamura, adapted from author's sketches



Drooping forms. If one wishes to have a Mame bonsai tree with drooping branches like those of old trees, it may be done by coiling copper wire around the branches and bending them downward, as is done with ordinary bonsai. However, since Mame bonsai are tiny things, the wires may cause damage; and so I sometimes hang a weight on the branch, to lower it.

The following is the way I usually do it and is the best way. The container is bound with string, somewhat as in tying a parcel, as shown in the sketch on the next page. The branches are lowered and held in the desired position by means of strings tied to them and fastened to the string around the con-



A small cryptomeria (*C. japonica*), 10 years old; and a 2-year-old tree raised from a cutting from the small one.



Young cryptomeria bonsai, wired to keep its trunk straight.

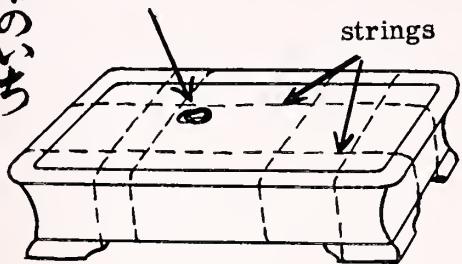
tainer. The strings are left on for several months, until the branches are fixed in the desired position.

Flowers and fruits. The shoots of flowering trees and shrubs should be pinched about the middle of June. (That is the beginning of the rainy season in Japan, and the young shoots are hardening.) Only about two buds should be left on each shoot; from these buds new branches will grow in July and August. These branches are to remain untouched until autumn; in November they should be shortened, leaving some flower buds which have formed. It is desirable to use a small pair of sharp pruning shears.

I do not take special care to induce my plants to form flower buds, but these develop well when the plants are exposed directly to the sun all the season, even on the hottest summer days.

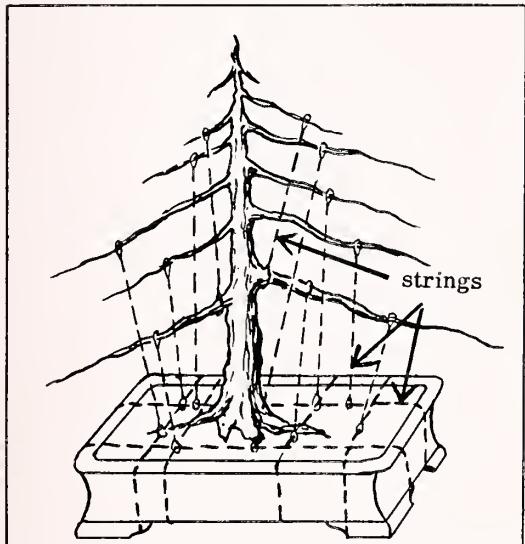
As shown in the accompanying photographs, the containers for Mame bonsai are very small; one of the smallest is only $\frac{3}{8}$ inch deep. Since the roots have

location of tree



Adapted from author's sketches

Tray showing the proper position for placing the plant, and strings to which branches may be tied.



A tree properly placed in the tray, with its branches tied to the strings around the container to pull them down into a drooping position.

so small a space in which to live and spread, in half a year (to say nothing of a year) they become bound in the container and often lift the soil some $\frac{3}{4}$ inch above the rim of the container.

Although they are very tiny in size, after becoming root-bound the flowering trees and shrubs produce flower buds in the normal season for each kind of plant. When the flower buds are formed, fer-

tilizing should be stopped. A fruit tree that has borne fruit should be given diluted liquid fertilizer again about two months after the flowers are shed; this fertilizing should be continued, with some intervals, until autumn.

My Mame bonsai flowering cherries and flowering apricots are only a few inches high, but they bloom well annually, while apple, crab apple, and pomegranate bear fruit. I have flowering and fruiting peaches, too. I deeply regret that the season is so far advanced that I am unable to show you these in flower and in fruit.

All the plants I am growing have small and neat leaves, as these are most suitable for Mame bonsai. Floribunda and Multiflora roses are blooming continuously and attain a height of 2 inches or so as Mame bonsai.

Repotting. To bear fruit, apple and crab apple trees should be repotted in the autumn, not in the spring. All fruit trees are repotted every autumn.

All the other trees and shrubs are repotted annually in the spring, say early April in Tokyo—except pines; these are repotted once in five or more years. Pine trees grow better if they are repotted once in three or four years, but then they grow too vigorously, break the balance of the trained branches, and cause some of the lesser ones to become weak and die.

The plant is taken out of the container and a large amount of soil is removed, very carefully, little by little, so as not to damage the roots. Then some of the older roots are cut off or shortened, and the other roots and rootlets are shortened slightly. The plants are repotted in the same containers filled with fresh soil of the same kind. They are then watered liberally. For about ten days after repotting, the plants must have special care; the oftener they are syringed, the better.

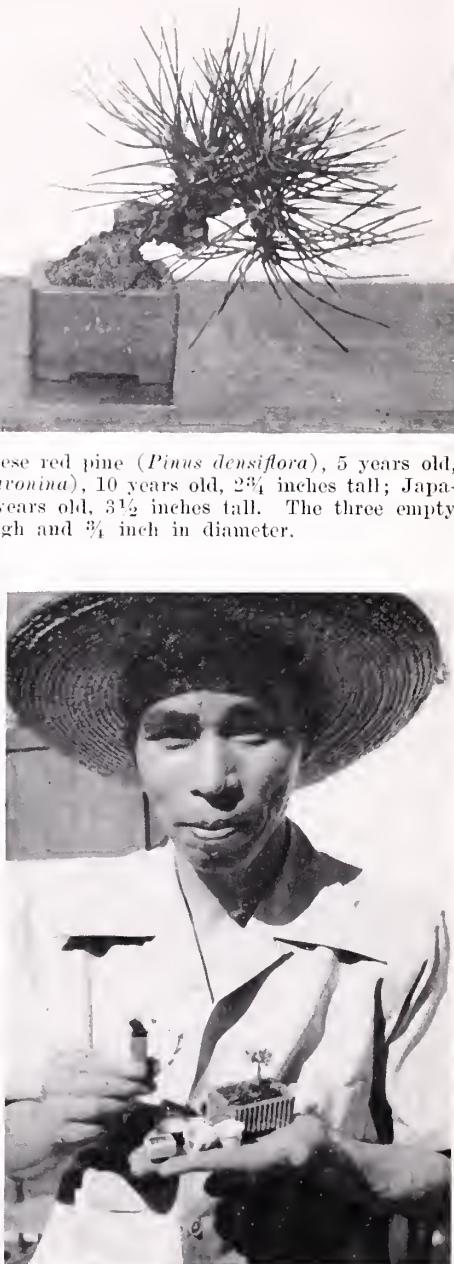
Herbaceous plants are generally kept without repotting for five to ten years; in this way they look better and become daintier.



Three miniature bonsai. *Left to right*, Japanese red pine (*Pinus densiflora*), 5 years old, 2 inches tall; red sandalwood (*Adenanthera pavonina*), 10 years old, $2\frac{3}{4}$ inches tall; Japanese black pine (*Pinus thunbergii*) about 30 years old, $3\frac{1}{2}$ inches tall. The three empty containers are each $\frac{3}{8}$ inch high and $\frac{3}{4}$ inch in diameter.



Two pomegranate seedlings, one 9 years old, 4 inches tall; the other 5 years old, $2\frac{3}{4}$ inches tall, in fruit. Below, old Japanese porcelain containers.



The author, holding in his left hand a miniature Japanese white pine (*Pinus parviflora*) and several of the small containers.

Summing Up

These are the essential points in growing Mame bonsai.

It is most important to keep the container well supplied with water. Adequate fertilizer must be given. The plants must be well exposed to the sun. The growing shelf must be well ventilated.

When the new shoots begin to harden, they are cut back or pinched off, with two buds left at the base of each. Strong water sprouts are never allowed to grow.

The plants should be trained in their natural shapes. It is better to train and trim with pruning shears than with wire.

Repotting at the proper time should never be neglected. As the plants are grown in very small containers, it is essential to cut off the older roots and encourage new ones to grow. The soil must be well drained. The plants must be kept particularly well watered for about ten days after repotting.

Soils are so varied in different places that I have not written in detail on soil. I am using many kinds of soil when-

ever they are available. Some trees need a particular kind of soil or compost, to be healthy in small containers; but each grower will soon find these.

In Japan the changes of the four seasons are clearly seen and felt. Flowers in the spring, dark green foliage in the summer, picturesque colors in the autumn—crimson, yellow, and other exquisite colors—and the still figures of deciduous trees in solitude in the winter, are all in poetic mood in nature. Also, and indeed in the same degree, such changes are shown in Mame bonsai growing in 1-inch containers.

Whenever you think that some of your own native plants are suitable to grow as Mame bonsai, take home some little ones and try them. It is not necessary to start with or buy finished Mame bonsai. You may bring home a few shells from the beach, make a hole in the bottom of each for drainage, fill them with soil, plant some young trees or herbaceous plants, and see how they will behave and grow. I should like, myself, to try some American plants as Mame bonsai if I could afford to live in America.



Mr. Nakamura with his 81-year-old mother, his wife, and his children, holding specimens of miniature bonsai. When Mr. Nakamura's stage appearances take him away from home, sometimes for months at a time, members of his family take care of "these wee lovely things."

THE MATSUDAIRA COLLECTION OF MINIATURE BONSAI

Some choice dwarfed plants and notes on their culture

Akiko Matsudaira*

*Mrs. Matsudaira is deeply devoted to miniature bonsai. For many years she shared her husband's enthusiasm for these tiny beautiful things. Her illustrious husband was the late Count Y. Matsudaira, a pioneer fancier of miniature, or *Mame*, bonsai (pronounced *muh-may bon-sigh*), who had built up a magnificent collection second to none.

There are many anecdotes about his enthusiastic behavior regarding these plants. Whenever he was on a trip, he used to carry some of his favorite *Mame* bonsai with him in a basket specially designed and manufactured for the purpose.—Guest Ed.

AFTER the great earthquake occurred in Tokyo and caused much disaster, in 1923, the city was barren and monotonous. It was then that my husband began to collect miniature, or *Mame*, bonsai. In the mountains and in other places he visited on his trips, he collected and purchased them as souvenirs. During the years when he was at the height of his zest for these plants, he grew seven or eight hundred of them.



Some of the miniature bonsai grown by the writer in her garden.

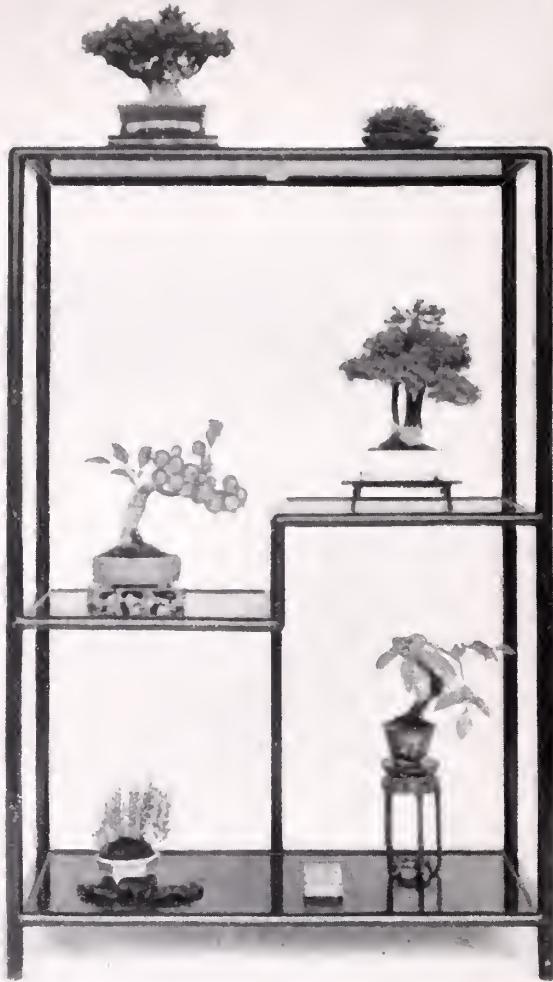


↑ Bamboo stand specially designed for displaying miniature bonsai. The plants, raised by the author, are: top, needle juniper (*Juniperus rigida*), 30 years; middle, barberry (*Berberis sieboldii*), 25 years; below, left to right: *Chiogenes japonica*, 10 years; maple, 25 years; an alpine plant, 10 years.



← Crab apple, 25 years, with twenty fruits.

Rosewood stand 28 inches tall, specially designed for displaying miniature bonsai. Top: cryptomeria, 30 years; a holly fern (*Polystichum stansdishi*), 10 years. Middle: crab apple, 25 years; Yeddo spruce, 30 years. Below: a St. Johnswort (*Hypericum senanense*), 10 years; a hornbeam (*Carpinus carpinoides*), 25 years.



I was faced with his death ten years ago, and during the war many of the miniature bonsai were destroyed by the bombing. Some of them were carried away from Tokyo to the country, to escape the dangers of war; but these suffered because I was short of hands, and some of them died. About two hundred survived and were brought here to Atami. Some of these are shown in the photographs.

The years mentioned for the plants are not their actual ages but the number of years I have been growing them.

Culture

Just after the equinox (the middle of

March) every year, all the Maine bonsai are repotted in new soil. Diluted liquid fertilizer made from well fermented rape cake is applied to them often in the spring and in the autumn.

Although they are tiny plants growing in very small containers, they are kept outdoors and exposed all day long to the hot sun and wind and rain, just like ordinary bonsai. In hot dry summer weather, they are watered three or four times a day.

To prevent ants from reaching the plants, all the legs of the growing shelf stand in water to which a few drops of insecticide have been added.

BONSAI AT THE BROOKLYN BOTANIC GARDEN

In addition to its famous Japanese Garden, the Brooklyn Botanic Garden has a modest collection of bonsai which is being extended each year. To Frank Okamura, caretaker of the Japanese Garden, has naturally fallen the task of maintaining and enlarging the collection. Because of quarantine restrictions, it is now difficult to import bonsai from Japan. Mr. Okamura must raise and train bonsai from seedlings, cuttings, or small nursery-grown plants; he has even found a few growing in the wild.

Mr. Okamura's approach to bonsai well expresses the Japanese spirit and philosophy. In the arts of painting and sculpture, truth, beauty, and goodness are expressed in the images portrayed or sug-

gested. The art of bonsai likewise expresses these values in form and color but adds one very important element—life. As living pictures, bonsai are ever changing and developing, becoming more beautiful and meaningful with the passage of time. In caring for and training a dwarf tree, one participates in the continuing creation and expression of beauty.

The culture of bonsai, Mr. Okamura feels, would be beneficial to many of us in the world today, caught up as we are in the rapid tempo of the time. The care and training of bonsai enforce the use of patience and require a slowing of pace even though it may be for only a few minutes a day. Their quiet beauty and the images of the majestic rhythms of

Frank Okamura and some of the bonsai in the Brooklyn Botanic Garden collection. Mr. Okamura is holding umbrella-plant (*Cyperus alternifolius*) growing in a bowl with rocks and water; he recommends this plant for beginners.

Louis Buhle photos





More of the plants in the Botanic Garden collection.

nature they invoke are soothing to taut nerves.

Growers of bonsai should study the ways in which trees grow in nature, then

attempt to duplicate these forms in their bonsai. To force the trees into strange and unnatural forms is to violate the spirit of bonsai.

Mr. Okamura working on an 80-year-old oak.



BALD CYPRESS BONSAI

From cuttings or from seedlings

Toyotaro Aoshima

BALD CYPRESS (*Taxodium distichum*) is a deciduous tree inhabiting swamps along the larger rivers in the southern part of the United States. It was introduced into Japan in the last century, and now many fine old trees are found here and there all over Japan.

A few decades ago, some bonsai fanciers were attracted by the graceful feathery, pleasing green foliage, slightly pendulous spreading branches, and massive trunk with cinnamon-brown bark. They set out to grow and train these trees as

Bald cypress bonsai about 12 years old grown by the writer.



bonsai and the results were very successful. Bald eypress are now highly thought of as bonsai, and a few of the oldest and best ones have been sold at high prices in the past year. As this tree is easy to train with copper wire, it should be tried by amateur as well as professional bonsai growers.

Bald cypress is called *Rakuusho*, or Feather-Falling-Pine in Japan, but bonsaimen prefer to call it Robe-of-Feather-Pine.

An acquaintance in an adjacent city had a very fine and well-trained bald cypress bonsai. I visited him, to take a photograph of the tree for this article, but it had been sold to a professional bonsaiman only the day before. Consequently all I can do is show one of my own comparatively young specimens. My tree is not a good example but it gives a vague idea how bald cypress is trained into bonsai to have a pleasing appearance. This tree was started by obtaining a very young tree raised from a cutting about ten years ago.

Cuttings are taken from the last year's growth; after the ends are cut cleanly with a sharp knife, the cuttings are inserted in clean sand kept moist. For the first two years the cuttings should be allowed to grow naturally, as in ordinary nursery stock.

Training. About the third year or so, one should begin to train them with copper wire, bending the trunk and branches as one likes. Before training is begun, the longer branches should be cut



Avery

Bald cypresses growing in their native habitat in southern United States, showing the buttressed trunks and the projecting root branches called "knees."



off; the aim should be to form a neat dwarf bonsai with low short branches.

Trimming of branches—removing or shortening them, or any cutting that causes a wound—should be done in the autumn, when the new growth is hardened. If trimming is done in the spring, when the sap has begun to flow, the sap will come out of the cut end, and the branch will die and may cause the loss of the tree.

If the branches are cut back to some extent when they are hardened, new growth comes out soon. If this cutting is repeated every year, nice bonsai can be formed in a few years.

Watering. Placing the bald cypress bonsai in a basin of water in the spring and summer is good for the tree and also helpful to the grower because then it does not need watering every day.

Repotting is done once in two or three years.

Seeds. Every year I try to raise bald cypress from seeds matured on near-by trees, but only one or two seedlings come up from all the seeds contained in a cone. If viable seeds are plentifully obtainable, I think it is better to raise bald cypress bonsai from seedlings.

Bald cypress about 60 years old, showing the slender pyramidal habit of the tree as it grows under cultivation in the Brooklyn Botanic Garden.

Louis Buhle



JAPANESE ZELKOVA BONSAI FROM SEEDLINGS*

How to raise the gray-barked-elm from seed and how to train the trees to form miniatures of the naturally grown forest trees

Senkichi Kano

MY prime objective in growing zelkova bonsai is to reproduce the image of Japanese zelkova (*Zelkova serrata*, or *Z. keaki*) which I have held in mind since early days when I was deeply impressed by these giant trees. Reproduction in miniature of the natural shape and appearance of the old trees is my purpose.

First Year

Sowing. The seed is sown in the spring (late March or early April). Outdoor sowing is satisfactory, but if one wishes to have only thirty to fifty seedlings for bonsai, it is better to sow the seed in a shallow pan, somewhat deeper than the

usual growing pans. To provide good drainage, a thin layer of coarse sand is spread on the bottom of the pan, which is then filled to a depth of 2 inches with loamy soil. This is smoothed and pressed lightly on the surface. Place the seeds singly at intervals of $1\frac{1}{4}$ to 2 inches on the soil, then sift light soil over them until they are covered. After it has been thoroughly watered with a sprinkling can, the pan should be placed under a tree or in some other place shaded from the direct sun; on rainy days it should be moved under a roof. Germination takes three to four weeks.

Transplanting. When the seedlings have produced two or three leaves, about the middle of May, they should be transplanted singly to small pots. Care should be taken to shorten the taproot and spread the slender side roots in all directions so that they will be well developed at the surface of the soil. Fertilizer is applied occasionally; I use decayed rape cake steeped in water.

First training. By August the seedlings will have attained a height of 10 inches or so; this is the time to place a bamboo cane at the side of the trunk for straightening it, tying the trunk to the cane at several places. To insure a straight trunk, the bamboo cane support is needed for three or four years.

Wild seedlings. If mature zelkova trees are accessible, usually one can find 2- to 3-inch seedlings under them in May

*For this article on the raising of bonsai from seedlings, I have been very fortunate in having, through my good friend Mr. Y. Uehida, the editor of a Japanese fruit-growing magazine, the cooperation of Mr. Senkichi Kano. Mr. Kano has long devoted his leisure time and interest solely to raising zelkova bonsai from seed. He is now growing some three hundred zelkovas in pans. These are from 14 to 16 years old and were all grown from seed by Mr. Kano. Born and spending his early life in the mountainous country near Mt. Fuji, Mr. Kano was deeply impressed by the grandeur of the giant zelkovas which he saw growing in nature and in home grounds and came to think of zelkova as the king of trees. Moving to the city of Shizuoka some forty years ago, he was struck by the fact that zelkova bonsai commanded far higher prices than any other kind. The timber of Japanese zelkova is one of the most highly prized in Japan. As Mr. Chadwick wrote (PLANTS & GARDENS, Spring, 1953, page 46), the tree tolerates city conditions well.—Guest Ed.



Gray-barked elm, or Japanese zelkova bonsai just after leaf thinning and trimming.

and June. If straight-trunked ones are selected and carefully dug out so that the roots are not injured, they are good enough to use for raising zelkova bonsai.

Second Year

Root training. The next March it is important to take the tree out of the pot, shake off part of the soil, and examine the root. The development of the root is the vital point in zelkova bonsai. If the roots are well developed on all sides and all these roots are balanced in size, then the tree is considered a fine one. Such nice trees are difficult to obtain, and scarcely one in ten seedlings is so formed. In most seedlings the roots are developed on only one or more sides but not all around. Such a seedling can be induced to produce roots on all sides by cutting off a narrow ring of bark ($\frac{1}{8}$ inch) at the base of the tree where the new root formation is desired, as shown on the next page. The tree is then planted in a deeper pot, the soil covering the roots to a depth of $5\frac{1}{2}$ inch above the removed bark ring. All the branches produced on the trunk are removed as soon as they sprout, since it is desired to keep the trunk clean and straight.

Leaf thinning. In the middle of May, leaf thinning is practiced, only one third

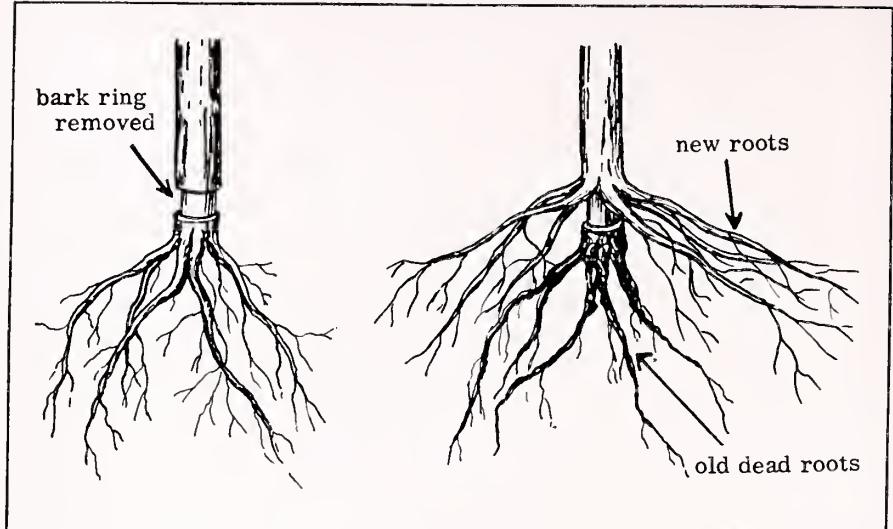
to one fourth of the total number of leaves being left. After leaf thinning, every shoot should be cut back so that only two or three buds are left. This retards growth and maintains dwarfness. The appearance of the trees after these operations is shown in the accompanying photographs.

Third Year

Root trimming. The trees treated for new root production have roots formed

One of the above trees two weeks later, with new foliage.





Redrawn from author's sketches

Left: Ring of bark removed at base of year-old zelkova tree to induce formation of new roots on all sides. *Right:* New roots above removed bark ring.

on all sides and at right angles to the trunk, and the old root system is nearly decayed. The old roots under the ring of new ones are cut off and all the new ones are shortened to a length of 2 inches.

Repotting. When the trees are repotted, great care must be taken to arrange the roots as shown in the first sketch on page 203. Unless the roots are arranged like this, the value of a zelkova bonsai is greatly reduced, as the exposed old roots are a primary object of appreciation.

It is essential to use dry soil for repotting, but immediately after repotting, the tree must be thoroughly watered. The pot is filled with water to the edge; when the water sinks away, the pot should once more be filled. While the water is sinking into the soil, the tree should be slightly lifted and shaken. Then the roots will appear exactly as in the second sketch on the next page.

Leaf and shoot trimming. As in the previous year, leaf thinning is practiced. The shoots are trimmed to a good shape and the denser parts thinned out. In trimming, care should be taken not to form the branches as shown in the

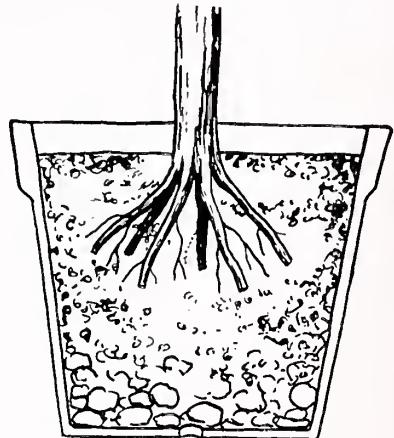
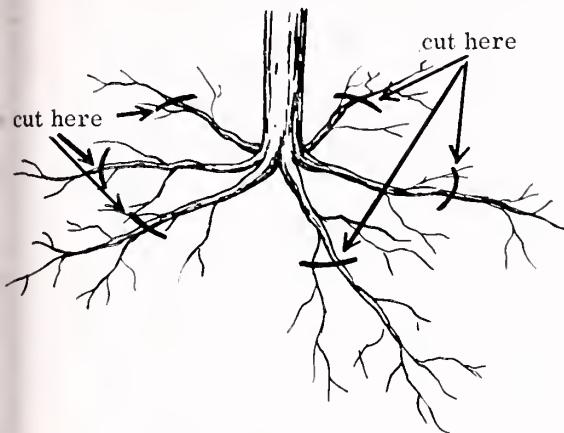
first four sketches below, but to try to have them as shown in the last sketch.

Fourth Year and Following Years

Repotting and root trimming. Transplanting (to a pot of the same size or larger) should be done in the spring. Thickly grown parts of the root mass are thinned and all the roots formed in the last year are shortened. Then the lower side of the root system is clipped



Left, opposite branches; right, one branch immediately above another; both to be avoided in good bonsai.



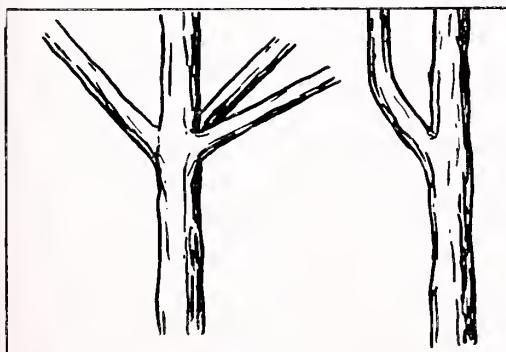
Left: Diagram showing how roots should be arranged and cut when tree is repotted. *Right:* Arrangement of roots after tree is watered and slightly lifted and shaken.

evenly with scissors to allow potting and growing in shallow pans. The shallower the pans in which the trees are grown, the better. This transplanting and root trimming should be done every spring throughout the coming years.

Leaf thinning should be done between the middle of May and late June, and at the same time shoot trimming should also be done.

Unwanted sprouts. At budding time in the spring and after leaf thinning, sprouts appear at unexpected places on the trunk and branches, and these should be rubbed off or cut off. Aphids and other insects are exterminated in the usual ways.

Autumn. After the leaves have fallen, any disproportionate and undesirable twigs and shoots are removed, so as to



Left, branches in a circle; *right*, branch parallel to trunk: both to be avoided.



Branches alternating and spreading—the result to be desired.



Winter appearance of a properly trimmed Japanese zelkova bonsai.

enhance the symmetrical and delicate beauty of fine twigs and shoots which produce the atmosphere and image of a great tree throughout the winter, as shown in the accompanying photograph.

In the spring, just before the buds burst, for the sake of possible improvement in the beautiful shape of the tree, twigs and shoots are cut back *as short as possible*. Then the renewing and rewarding beauty of the young leaves is awaited.

General Care

For potting soil for zelkova bonsai I use loamy soil from cultivated land or sandy loam from the mountains. The soil is sifted through a sieve ($\frac{1}{8}$ -inch mesh), and used only after it has been well and thoroughly dried. The tree should be planted in the dry soil in the pan, and the pan shaken several times after planting. The surface of the soil is then leveled and immediately watered gently and thoroughly with a watering can. The soil should *never* be pressed.

Surface roots. When a zelkova bonsai becomes older, several roots become thick and appear at the surface of the soil. Such a "root-surfaced-on-the-soil" tree is much sought after and very ornamental. (See page 158.) However, if the roots are

surfaced when the tree is young, they never thicken; only roots in the soil will do so. After learning by bitter experience, I cover surfaced roots slightly with soil, and on this place moss. As the roots develop, the moss becomes scanty and the roots gradually appear on the surface. The trees in the photographs are 14 to 15 years old and the roots are not yet developed sufficiently to appear on the soil. I have several trees of the same age that do show surfaced roots. Bonsai merchants often show surface-root formation in young trees for commercial reasons, but this is not good for nice root formation on the soil later on.

Shading. In the hottest weather, July and August, the trees are shaded; I use marsh-reed screens.

Watering. Overwatering is not good for the trees. However, as zelkova bonsai are grown in shallow pans, they dry out rapidly in the summer, and watering twice a day is necessary; but in other seasons once a day is enough. After the leaves fall in the winter, it is sufficient to give water once every other day.

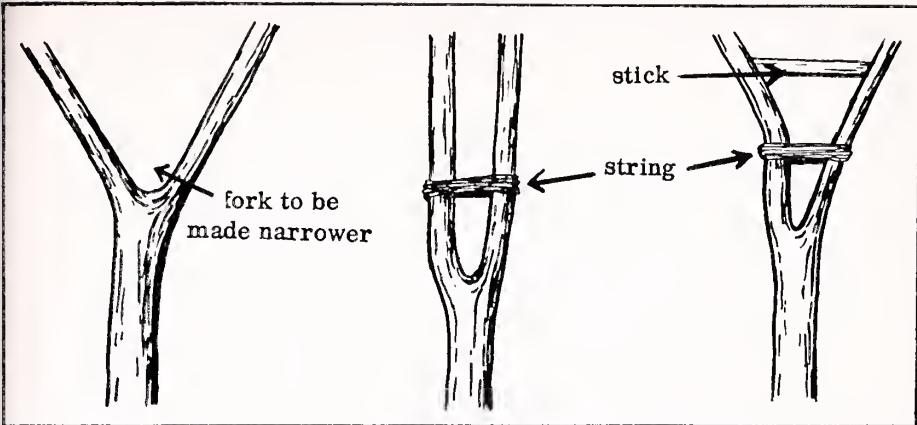
Training

Materials. For training one should have at hand bamboo cane, string, and wire.

The bamboo cane is split into pieces and each piece is whittled to suitable size for use as a splint for fixing a shoot or a branch in the desired position. The bamboo splints should be tied with string at intervals of an inch or more.

For tying bamboo splints in place, instead of string I prefer the leaves of *Yucca recurvifolia*, an American desert plant which is now grown here and there in Japan. The leaf is split into thin strips and exposed to the sun for one or two hours; it is then just right for tying. If it becomes old and dry, it can be immersed in water before use. It has the advantage that knots made in it do not work loose as do those in string.

If one wishes to narrow a wide fork, the branches should be tied closer together with the yucca leaf. If it is desired to widen the upper part of the fork,



Redrawn from author's sketches

Diagram showing how to change the shape of a fork.

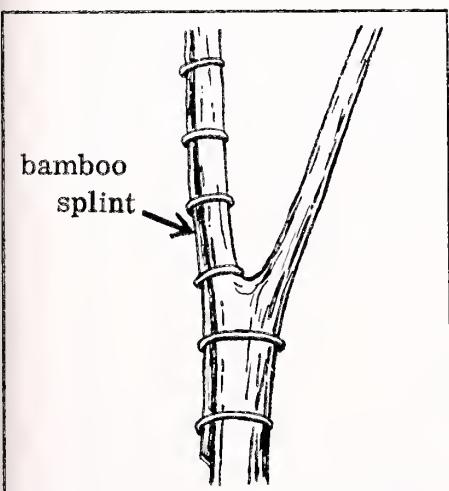
a bamboo stick should be placed between the branches, as shown above.

Slender branches trained as described will be well fixed in position in one month or so; thicker ones will take three months.

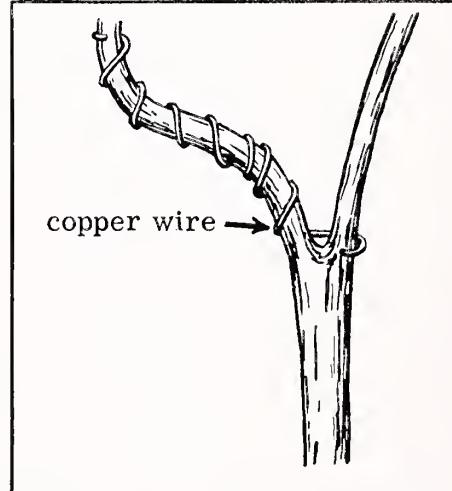
Copper wire is better than the bamboo for curving branches. A wire of thickness suitable for the branch is selected and coiled around the branch; then the branch is bent to the desired curve. Although easy

to use, copper wire will cut into the branch if left on too long a time. Wire should not be left coiled around the branches for more than two months; it is wise to examine it after forty to fifty days.

In growing zelkova bonsai for many years, I have observed many variations in individual trees in the color of young leaves, teeth on the margins of the leaves,



How to tie a bamboo splint on a branch to hold it straight.



Method of coiling copper wire around a branch to hold it in a curve.



The author and some of his zelkova bonsai.

and general form. When they are grown in very shallow pans as shown in the photographs, the leaves become smaller and neater.

Raising zelkova bonsai from seed is very interesting with its growing, thinning, pinching, trimming, and training. No gorgeous colors are produced at any time of the year during the long life of the trees; it is their stature when bare or in full leaf, the aged bark, surfaced roots, and slender, graceful twigs and shoots that charm us so much. Bonsai trees 10 to 20 years old are not yet old enough to give full satisfaction; I think one must wait until they become 50 years old; then at last they are perfect zelkova bonsai.

AN UNUSUAL PLANT

In middle and southern Japan *Psilotum nudum* grows wild on old trees and on rocks, becoming a foot or so tall. At one time it was in fashion as a cultivated plant, and many varieties have been developed. The one shown here is the yellow-tipped variety, which I have grown for years. It is growing in sphagnum moss with a little coarse sand added, and with some charcoal in the bottom of the container.

Regulating the amount of water given induces the plant to become dwarf and very neat. It is very lovely, with many tiny roundish spore cases on the upper parts. It is a primitive plant and has neither flowers nor cones. If it is grown in coarse sand alone, it becomes neater and a little dwarfer.

K. Y.





A few of Mr. Nagao's Yeddo spruce bonsai on growing shelf.

YEDDO SPRUCE BONSAI FROM CUTTINGS

How to make and care for the cuttings; how to dwarf and train the trees in ordinary bonsai style or in clasping-stone style

Jitaro Nagao

YEDDO SPRUCE (*Picea jezoensis*) is a good example to show the technique by which bonsai may be made from cuttings, improved year after year, and kept in very dwarf form within the limited space of the container.

Raising Yeddo spruce bonsai from cuttings is very popular, for two reasons. First, Yeddo spruce is a most suitable conifer for bonsai: it is very lovely and pleasing, particularly in the light green color of the new growth; it is easy to raise from cuttings and easy for the novice to train. Second, the naturally dwarfed old Yeddo spruces from their native hab-

itsats have become very scarce in Hokkaido; and the Kurile Islands (the best collecting place) are now cut off from Japan.

My father is said to be the first man who tried to raise Yeddo spruce from cuttings; if I remember rightly, he first tried it in 1913. At that time he was much interested in the *Ishitsuki* style of bonsai, or growing the plant clasping a stone. He made cuttings of Yeddo spruce and they were rooted the second year. After growing them two years more, he trained them in the *Ishitsuki* style of bonsai. The result was very satisfactory;



Yeddo spruce cuttings in propagating bed.

hence *Ishitsuki*-style Yeddo spruce has become very popular among novices and experts alike.

Cuttings

A good container for rooting the cuttings is a shallow wooden box 1 by 2 feet or so, with some holes in the bottom, or a shallow pot. A little sphagnum moss is spread on the bottom; then the box or pot is filled with sharp, fine sand.

Time. The cuttings are best made in the spring or early summer: in the spring, just before the buds open; or in the summer, when the new growth is hardened. In the summer, only the new growth is used, because it is quicker to root than the old growth—which must be used if the cuttings are made in the spring.

Each spring during the training or improving of Yeddo spruce bonsai, some shoots are shortened or cut off entirely; these shoots are very good material for cuttings. Every fancier of bonsai likes to raise new plants from his own.

The tips of the shoots are taken for cuttings, 1 to 2 inches long; after being

recut with a sharp knife, they are inserted thickly in the prepared box or pot.

The container is watered thoroughly from above, and shaded; I use a screen made of marsh reeds. The cuttings must be syringed several times a day for a month or so; this must never be neglected.

Watering in the summer should be very carefully and thoroughly done and never neglected.

Fertilizer. As with other conifers, Yeddo spruce needs only nitrogenous fertilizer such as rape cake or soy bean cake, while flowering and fruiting trees need more of other elements.

The fertilizer should be applied chiefly in the autumn, when growth has ceased, or after the autumn transplanting. In the growing season a small amount of fertilizer is enough. If much fertilizer is given during the growing season, the leaves become long, soft, and untidy, and strong shoots weaken others; consequently the most desirable or necessary shoots may become poor and die.

Transplanting. In the autumn, say October, the rooted cuttings are transplant-



Yeddo spruce cuttings 2 years old.

ed into new fine sand, an inch or so apart. The cuttings generally have two or more tiny branches, and the tips of these branches will touch after the cuttings are transplanted. Sometimes transplanting is done in March or April. In either case (autumn or spring transplanting) the marsh-reed screen is needed for shade, as the young plants burn quickly in the sun.

For a year or so the young plants grow slowly, but in two or three years they show vigorous growth.

Training

Potting. Plants 2 or 3 years old are ready to have their training begun, to suit one's taste. They may be placed singly in containers that seem a little too small for them; or if one desires a miniature forest, he should put several plants together in a shallower and wider container. When a community is thus formed, the branches should be thinned and some of them shortened.

The soil used is a kind that is very porous and poor in nourishment; the sub-soil in Japan fulfills this requirement; it

is never enriched; sharp sand is liberally added to it and well mixed with it.

The drain hole at the bottom of the pot is covered with a piece of broken pot; then a thin layer of coarse sharp sand is put in, to allow good drainage. Over this some of the prepared soil is added. The long root of the plant should be shortened. Then the tree is held in the pot with one hand while the soil is filled in with the other and finally rather firmly pressed.

The pot must then be watered very thoroughly. Continued watering must be carefully attended to until new growth appears, and the soil must not be allowed to dry.

Fertilizer. According to the amount of growth, fertilizer should be given twice or thrice in the spring and in the autumn. Rape cake is put in several places on the surface of the soil, or it may be used as liquid fertilizer; for the latter, water in which the cake has soaked for many months is diluted to the proper strength.

Time. Training is best done in March and April, but it may be practiced



Yeddo spruce bonsai about 30 years old.

through the winter, beginning in the autumn.

The desired shape depends entirely on one's taste, of course; but it is better to follow the nature of Yeddo spruce. As good examples to follow, there are here shown photographs of some old Yeddo spruce bonsai—old trees collected in their natural habitats and further trained.

Method. Generally speaking, the most difficult method of training bonsai for the novice and the expert alike is spirally coiling wire around the branch to change it into the desired shape. Happily, however, the wiring of Yeddo

spruce is very easy and hence satisfying even to the very beginner. There is only one thing about which the trainer must be cautious. Even slight twisting kills the branches of Yeddo spruce by separating the bark from the wood. Foreibly lifting weeping branches has the same effect. If this peculiarity of the tree is understood and taken into account through the years of training, Yeddo spruce is, as just said, a very easy and pleasant plant to train.

The technique of training a branch into the desired shape is gently to curve it or change its direction while spirally coiling a wire around it. Half a year

Yeddo spruce more than 20 years old.



or a year later the wire should be uncoiled and removed from the branch, as the branch will then keep its shape without the wire. After they have passed a year without the wire, some of the branches may be somewhat out of shape; these should be wired again and the wire kept on for two more years. Whenever wiring is done, overlapping or weakened or unnecessary branches should be cut off to make the remaining branches healthier and more shapely.

Pinching. In the course of training, pinching of the new growth each year is important and never to be neglected during the whole life of the bonsai. The

time for pinching is May and June, when the new growth is $1/3$ inch to $1\frac{1}{8}$ inches long. Half to two thirds of the length of the new growth should be pinched off with the fingers; this must be done carefully to prevent the whole of the new growth from coming off. If the new growth is too hard to be pinched with the fingers, scissors may be used; but finger pinching is better for the plant and has more tendency to keep it dwarf. This is the golden rule of pinching.

When the tree becomes older, deeper pinching should be practiced, leaving only a small portion of the new growth. If it is desired to shorten a long shoot



A single Yeddo spruce between 50 and 60 years old, clasping a stone.

to encourage the growth of the branch formed at its base, this should be done gradually, in two or more years, so as not to weaken and kill the branch at the base.

Repotting

Time. Repotting during training is best done in the early spring before the buds open. Sometimes it is attempted when the foliage is well matured; but if it is thus delayed, the new roots will not be formed within the year, and so failure results. Only the expert can repot at any other season than early spring.

Repotting should not be needed each

year; once in two or three years is enough.

The soil should be porous loam and peat well mixed with sharp sand; various proportions may be tried and the results watched. Results are noticeable in the growth, luster, and size of the leaves, in the health of the roots, and in the condition of the soil—whether it remains porous and does not pack down hard. Such effects will indicate the right materials and the right proportions for the soil.

Method. The tree is pulled out of the container; the old soil is carefully shaken off as far as one-fourth to one-third of the radius of the root ball. The roots



Several Yeddo spruce trees, 40 to 50 years old, growing as a miniature forest on rock.

that were wound around the inside of the container are cut off first. Then all the roots are pruned; most of them not so far back as at the last pruning, but some of them farther back; this will keep the healthy roots within the dimensions of the container.

If the plants are to be grown in shallower containers, the lower roots should be cut off, and the upper and surface roots encouraged. Gradually the old tree can be grown in a very shallow container in a healthy condition.

The tree should be repotted in the container and new soil filled in. A stick may be used to poke the soil into contact with the roots. Water should be given just until it drips from the hole in the bottom.

Clasping a Stone

Yeddo spruce is very easy to train in *Ishitsuki* style, or clasping-stone style, as mentioned before. To begin with, suitable stones should be obtained. Whenever the bonsai fancier is on a trip, well formed stones will attract his attention.

Time. The clasping operation should be done generally in the spring or autumn; but winter is not a bad season if it is not too severe.

Number of trees. After a stone is selected, one should consider how many trees may be suitably planted on it, and how many crevices it has that are favorable for the roots. One should imagine the development, in years to come, of a miniature landscape which he is creating.

Planting a miniature forest. Each tree should be put into the place chosen for it, and its roots directed downward in a crevice or spread on the face of the stone. The roots should then be plastered to the stone with tough peaty soil. Finally moistened sphagnum is put on over the soil and held there with wire or string, to keep the soil from drying and to hasten and encourage the growth of roots.

Container. If one desires to place the stone in a container with soil, it is best to select a long-rooted tree and put the farther end of the roots in the soil of

the container. If one prefers to place the tree-clasped stone in a shallow basin of water, he should use good enough soil on the stone in the beginning and spread the roots within the dimensions of the stone.

Shading. The trees must be grown in the shade of the marsh-reed screen for some time, until they recover from the shock of transplanting and become rooted on the stone in firm contact with the soil.

Training. In one or two years the trees will be very well rooted and become vigorous. Then the training may begin. Too early wiring would weaken the trees.

In starting the clasping-stone style, an important point to understand is that young trees grow far faster than older ones. One must therefore be careful not to overplant, lest the trees soon become too crowded and out of proportion to the stone on which they grow.

Miniature forest of Yeddo spruce; trunks and branches being trained with copper wire.



LOTUS IN A BOWL

The photograph shows my first attempt at growing East Indian lotus (*Nelumbo nelumbo*, or *Nelumbo nucifera*) in a rather small bowl—a water-holding bowl, with no hole in the bottom. This is one of the dwarfest varieties; it grows dwarfer here than it would in a larger bowl or in a pond.

To have the plant bloom in the smallest possible bowl, grow it in bowls for several years and transplant it to a smaller one each year in late spring. I have read that some fanciers in the last cen-

tury succeeded in bringing the East Indian lotus into bloom in 6-inch bowls.

Short-jointed tubers should be selected for this kind of culture. A rich, well fertilized soil should be prepared; I find that the best dried herring makes a very good fertilizer.

The plant will never come up again if the tubers are frozen. In the winter the bowl may be sunk deep in a pond; or the water may be poured out, and the tubers stored in a warm place and moistened occasionally.

K. Y.



SATSUKI AZALEAS AS DWARFED POTTED SHRUBS

Growing and training beautiful flowering bonsai

Tomisaku Ugajin

AMONG ornamental plants, flowering cherries, camellias, chrysanthemums, Japanese irises, and Satsuki azaleas are some of the great contributions of the Japanese to horticulture. The first four of these, which we have been improving

here in Japan for centuries, are now also being improved and are in popular favor in many other countries. What, then, of the Satsuki azalea? In the latter half of the nineteenth century, Satsuki azaleas were taken overseas like many other Japa-



A z a l e a M I N E - N O - Y U K I
trained as a bonsai. The
photographs in this article
are taken from the
author's book.



Azalea OHSAKAZUKI. This and the other azaleas illustrated in this article were grown by Mr. Ugajin.

nese plants, but I am not familiar with any azaleas from other countries which have been developed from our native Japanese *Rhododendron lateritium*.*

Description. Unlike Indian azalea, which has been developed purely for its flowers, Satsuki azalea has tidy fine-textured leaves and appealing habit of

growth of branches and trunk, in addition to the blossoms. It is very well suited for use as bonsai and is the most popular azalea grown in Japan for this purpose. Satsuki azalea generally blooms in early summer, after the young foliage is well expanded. Nowadays, larger blossoms are popular, being 5 to 6 inches in diameter in such varieties as BANJO, BANKWA, GETTOKU, TAIHEI, and BANJO-NO-TSUKI. Some have flowers narrow-petaled, curiously shaped, double, or hose-in-hose (with one corolla within another). Striped, bordered, and white-based blossoms in purplish crimson, other purplish shades, pink, and similar colors are much admired in Japan. Satsuki azalea is most highly developed and appreciated in Utsunomiya (a city not far from Tokyo), where I live and grow it, and in the adjacent districts.

*The Satsuki azaleas are derived chiefly from *Rhododendron lateritium*, which is indigenous to Japan; in 1916 Rehder recognized this species as *R. indicum* var. *lateritium*, but all authorities now call it simply *R. indicum*. Some of the Satsuki group have *R. eriocarpum* in their parentage; this Japanese species is now regarded as a variety of *R. indicum*.

The Satsuki azaleas are therefore of Japanese origin, and are different from (though closely related to) the so-called Indian azaleas, now called *R. simsii*, which have originated from Chinese species.

Culture

Soil. Two kinds of soil mixtures are used for Satsuki azalea bonsai.

For young plants:

Kanuma soil*	4 or 5 parts
Sphagnum moss	3 parts
Leaf mold	2 or 3 parts
For 4- or 5-year-old and older plants:	
Kanuma soil	5 or 6 parts
Sphagnum moss	3 parts
Leaf mold	1 or 2 parts

Kanuma soil is found only at Kanuma, near Utsunomiya; it is no exaggeration to say that its discovery brought about a great revolution in the culture of Satsuki azalea and that is why Utsunomiya has become the center of Satsuki azalea culture. Before the discovery, we had to prepare soil, crumbling and sieving red clay after it was well dried, and still the plants grew very poorly and required much care. It was not easy to grow 100 Satsuki azalea bonsai, to say nothing of 1,000.

The sphagnum moss should be chopped finely and sifted through a sieve of $\frac{1}{8}$ -inch mesh before being mixed with the soil. Instead of sphagnum, mosses grown on the mountains are often preferred, particularly for young bonsai. Sometimes coarse sand is substituted for these mosses when they are not available. If the plants are in unhealthy condition because of overfertilizing, decaying roots, etc., reduce the amount of leaf mold when preparing the soil for repotting. Before being used, the mixed soil should be sorted into two or three grades differing in size of particles, by sifting through sieves having meshes of various sizes. If it is divided into two grades, the coarser-grained should be placed in the container first, filling it two thirds from the bottom, with the remaining third filled with the finer-

grained soil. If three grades are used, the coarsest should be used for the bottom third of the container, the medium grade for the middle third, and the remainder filled with the finest-grained soil. Finely pulverized soil should never be used; the smallest soil particles should be removed by sifting, and thrown away before the soil is mixed.

Repotting is best done just after flowering—mid-June to early July at Utsunomiya. It is also sometimes done in spring, before the buds burst. Autumn repotting is not so good. It is not necessary to repot every year, but only when the plants are found to be pot-bound.

The fertilizers used mostly are soy bean cake, rape cake, and dried fish (herring cake, etc.). These are pulverized and placed on the surface of the soil in the container, a small quantity once or twice every month. These fertilizers should be mixed in varying proportions according to the age of the plants and the season in which they are applied.

Water is given to young plants three or four times a day in spring, summer, and autumn; to old plants, twice a day, in the morning and in the evening. In warm weather it is good to syringe the plants.

Exposure. A sunny and well ventilated place is the best for growing Satsuki azaleas, but in the height of summer they should be in partial shade; I place them under a marsh-reed screen. The more they are exposed to the sun, the better they grow and the thicker the trunk and branches become; therefore to the extent that one can afford the time and effort, they should be watered liberally in order that they may thrive even under the hottest sun. With the approach of freezing weather (in November at Utsunomiya), keep them in a sunny place and prepare the frost cover.

Propagation. Satsuki azaleas for bonsai are propagated by cuttings. When the young shoots attain a length of $2\frac{1}{2}$ to

*Kanuma soil is light yellow in color, crumbly, light in weight, porous, and granular; it absorbs water quickly. You may imagine it to be like soil treated with Krilium or similar soil conditioners; such soil can be substituted for Kanuma soil.—Guest Ed.



Azalea KODAI-NISHIKI.



Azalea SATSU-MA-BENI.

4 inches and are somewhat hardened (that is in May or June), the shoots are cut off, a few leaves at the bases removed, and the bases recut on a slant and placed in water for two or three hours. These should then be inserted 1 to 2 inches apart and an inch or so deep into a mixture of 4 to 5 parts of Kanuma soil and 3 parts of chopped sphagnum moss. Generally they should root in thirty to forty days. After remaining for fifteen to twenty more days in the cutting boxes or pans, they should be transplanted into soil prepared as described above for young plants. Two weeks or so after this, fertilizer is placed on the soil to encourage growth. If liquid fertilizer is preferred, it must be very dilute, otherwise the fibrous roots often become damaged and may decay.

Training the Plants

Forms. Training Satsuki azaleas as bonsai is most interesting. The forms





Azalea HINO-TSUKASA.

into which they are trained vary according to one's taste and the nature and shape of the plants used. Some of the popular forms are upright single-trunked, upright two-trunked, cascade, several-trunked, several plants potted together, and clasping-stone style. All the training should be carried out gradually, giving consideration to the nature of the azaleas and one's taste. The best times to practice training are just before or just after flowering or from mid-September to October. If training is done in the earlier season, the branches will be fixed and the plants can be released from the copper wire coils in the autumn.

Wire. Six or seven kinds of copper wire are used, selected from No. 1 to No. 23, according to the thickness of the trunk and branches. The wire is well burned in a rice-straw fire before being used.

Starting the training. It is better to start the training while the azaleas are young, say 3 to 4 years from cuttings,

or 1/3 inch or so in diameter at the trunk. In these azaleas it is not difficult to curve the trunk as one wishes, coiling No. 10 copper wire around it. To the branches No. 12 to No. 20 wire is applied, according to their thickness. The copper wire should never be coiled around the trunk and branches too tightly, as it may damage or even kill them. As a precaution the trunk and branches may be covered with hemp fiber before training with the copper wire. If bending at an acute angle is desired, great care must be taken, as breaking will easily occur at the point of bending.

Trimming. All Satsuki azalea bonsai should be trimmed just after flowering, as the new growth breaks the harmony of form or becomes too dense, or shoots that are too strong are produced. If such undesirable growths are cut off or shortened, other new growths may be produced at the point of cutting, and if they are not produced too late, they will form flower buds.

Greenhouse plants. Young azaleas grown in the greenhouse are easier to train into any desired shape and to bend very sharply.

Aims. Satsuki azalea bonsai fanciers can be divided roughly into two classes: one group appreciates chiefly the styles and shapes of the plants themselves; the other is interested mainly in the blossoms. The latter group can be again divided into two; some of them are interested in the size of the individual blossoms, the others in the colors and markings of the flowers.

To really appreciate the styles and forms of the shrubs, one must have aged and well trained plants, and so Satsuki azalea bonsai have not become every man's hobby. However, starting with several-year-old young plants obtained from nurseries or raised by yourself from cuttings, you can easily train them and in a few years obtain very nice dwarfed plants, tastefully branched. In the course of training these, you will find much of interest and enjoyment.

A BONSAI OWNER IN NEW YORK CITY

While Dr. Herman F. Froeb was with the Medical Corps in Korea, his wife lived and worked in Tokyo. Shortly before returning to the United States Dr. Froeb joined Mrs. Froeb in Japan. On a visit to a bonsai nursery in one of the suburbs of Tokyo they saw a lovely little Sargent's juniper bonsai (*Juniperus chinensis sargentii*) and decided to bring it home, with the happy result shown in these pictures. The tree survived in spite of having all the soil washed from its roots (United States Plant Quarantine Regulations) and having the roots packed in damp moss during the long journey to this country. The little tree, over 60 years old, is now happily at home in Peter Cooper Village in New York City.



Louis Buhle photos

↑ Mrs. Herman F. Froeb sprinkling the foliage of the Sargent's juniper bonsai she and her husband brought from Japan.



↔

A closer view of the juniper. Its luxuriant dark green foliage contrasts beautifully with the gnarled gray trunk and brown container.



Single small-flowered chrysanthemums grown in cascade and bonsai styles.

CHRYSANTHEMUMS, BONSAI STYLE

Beautiful bonsai plants in one year

Kan Yashiroda

SINGLE small-flowered *cascade* chrysanthemums, so called because they have been grown for many decades in the cascade style in pots, are popular among bonsai and chrysanthemum fanciers for training into the style of bonsai.

In growing trees as bonsai, starting from seeds, cuttings, or young nursery-grown stock, one must wait many years to have an appreciable bonsai—though the years of growing and training are certainly not tiresome. Bonsai from cascade chrysanthemums are completed within a year, and there are few bonsai that are so floriferous for so long a time or have such lovely blossoms.

The customary cascade chrysanthemums are trained in a long triangular shape, falling just like a cascade in front of the

container. Some of these are shown in the accompanying photograph.

Cascade Style

I will begin with the growing and training of the customary cascade chrysanthemums.

Varieties. There are many varieties one can pick for his own purpose. Strong large-growing varieties are best for big cascades for a large hall or show; medium-growing kinds are suitable for room decorations; the dwarfer ones can be trained in the orthodox style of bonsai.

Cuttings from suckers. From November on, when cascade chrysanthemums are finishing their flowering, suckers are produced freely. Those that come

up near the edge of the container are selected and cut off to a length of 2 or 3 inches. Care should be taken to choose suckers that have not produced roots, lest in the course of growing, sprouts come up near the base of the stem, injuring the growth of the leader and spoiling the intended shape. Suckers should be taken and planted from November to March. They root readily, and the earlier they are taken, the larger the resulting plants.

The suckers are planted in a shallow wooden box or container having good drainage, in a mixture of loam and sand. (Heavily fertilized soil should be avoided.) They are then watered liberally and put in a shady place. After a few days they are brought gradually to the direct sun in order to produce the vigorons, thick-stemmed plants which are desired.

Potting. Two or three weeks after the suckers have been brought into the sun they are potted singly in small unglazed pots—say 4 inches in diameter,

As the plants increase in size and become pot-bound, they should be shifted into larger pots three or four times. Finally they are moved to 8- to 10-inch pots for growing in the orthodox bonsai style, to 14-inch pots or larger for growing in large cascade style.

The soils used vary greatly in composition, since almost every grower appears to know how to prepare what he considers the perfect mixture. I imagine it is just the same among American chrysanthemum lovers. One example of a mixture is 5 parts loam, 4 parts leaf mold, a small amount of fermented rape cake or soy-bean cake, and straw ashes.

Training. Two weeks or so after the first repotting, the plants will have attained a length of 10 inches or more, with side shoots. Then, if a broad cascade style is desired, a slender bamboo cane or a thick wire is fixed in the pot at an angle of 45 degrees and the main stem is tied to this so that the leader will grow parallel to it. As the leader grows it is continually retied to the

Cascade chrysanthemums grown in various styles after the manner of bonsai.





Cascade chrysanthemums in bonsai style.
Compare azaleas on opposite page.

cane. The side shoots are pinched back to four or five leaves. The longer, weeping style of cascade is obtained if placing the cane and tying the leader are delayed until the stem is 15 or more inches in length. Again, the side shoots are pinched back to 4 or 5 leaves. As the weather becomes warm and the plant makes more rapid growth, pinching must not be neglected and the leader must be continually tied to the cane. Generally when the lower branches have produced five or six leaves they are pinched back to four or five; when the upper branches have produced three or four leaves they are pinched back to two or three. The rule is not a fixed one, however. To produce, in the end, an evenly densely branched surface, precise judgment is needed on just how much to pinch this or that branch. This judgment is soon acquired in growing and pinching a few cascade chrysanthemums, if one is a keen observer.

The final pinching is generally done in mid-September, when some tiny flower buds are appearing towards the tip of the plant. If this pinching is done too early, the branches continue to grow after the flower buds are formed; con-

sequently the plant looks unsightly when hung down. On the other hand, if it is done too late, flower bud formation on the lower branches is delayed, and so the blossoms do not open simultaneously all over the plant.

Lowering the plant. As the plant grows, in addition to shifting to larger pots, the supporting cane should be gradually lowered until it has reached a nearly horizontal position by the time the flower buds are formed all over the plant, say the beginning of October. Now is the time to hang the plant down to form the cascade. The lower part of the leading stem is wrapped with raffia as a precaution against breaking; the cane or wire is removed while the plant is held firmly and then gently lowered and allowed to hang down under its own weight. Sometimes wire is coiled around the stem which is to be bent down; this is removed about twenty days later. The operation requires great care, as the stem is brittle.

Bonsai Style

Many bonsai lovers feel the customary style (upside-down pyramidal shape) to be monotonous, and practice many of the styles seen in tree bonsai with great success. Irregularly and artistically shaped cascade chrysanthemums are shown on the preceding page. Some of these have two or three leaders instead of one; some are very much dwarfed. In the customary cascade chrysanthemums the leader is not pinched off until the plant is full-grown, while in the modified bonsai styles the leader (or some of the leaders or all of them) is pinched back once, twice, or more, if necessary in order to encourage the growth of a certain branch or branches or to develop the desired shape. Stopping the growth of the leader by pinching it produces a dwarfer plant.

Exploiting the chrysanthemums. Some growers like to train the cascade chrysanthemums to the exact form of tree bonsai such as the thick-barked Japanese black pine bonsai shown elsewhere in this issue (page 151) or like the Yed-

Azalea OHSAKAZUKI. This and the other azaleas illustrated in this article were grown by Mr. Ugajin.



nese plants, but I am not familiar with any azaleas from other countries which have been developed from our native Japanese *Rhododendron lateritium*.*

Description. Unlike Indian azalea, which has been developed purely for its flowers, Satsuki azalea has tidy fine-textured leaves and appealing habit of

*The Satsuki azaleas are derived chiefly from *Rhododendron lateritium*, which is indigenous to Japan; in 1916 Rehder recognized this species as *R. indicum* var. *lateritium*, but all authorities now call it simply *R. indicum*. Some of the Satsuki group have *R. eriocarpum* in their parentage; this Japanese species is now regarded as a variety of *R. indicum*.

The Satsuki azaleas are therefore of Japanese origin, and are different from (though closely related to) the so-called Indian azaleas, now called *R. simsii*, which have originated from Chinese species.

growth of branches and trunk, in addition to the blossoms. It is very well suited for use as bonsai and is the most popular azalea grown in Japan for this purpose. Satsuki azalea generally blooms in early summer, after the young foliage is well expanded. Nowadays, larger blossoms are popular, being 5 to 6 inches in diameter in such varieties as BANJO, BANKWA, GETTOKU, TAIHEI, and BANJO-NO-TSUKI. Some have flowers narrow-petaled, curiously shaped, double, or hose-in-hose (with one corolla within another). Striped, bordered, and white-based blossoms in purplish crimson, other purplish shades, pink, and similar colors are much admired in Japan. Satsuki azalea is most highly developed and appreciated in Utsunomiya (a city not far from Tokyo), where I live and grow it, and in the adjacent districts.

Culture

Soil. Two kinds of soil mixtures are used for Satsuki azalea bonsai.

For young plants:

Kanuma soil*	4 or 5 parts
Sphagnum moss	3 parts
Leaf mold	2 or 3 parts
For 4- or 5-year-old and older plants:	
Kanuma soil	5 or 6 parts
Sphagnum moss	3 parts
Leaf mold	1 or 2 parts

Kanuma soil is found only at Kanuma, near Utsunomiya; it is no exaggeration to say that its discovery brought about a great revolution in the culture of Satsuki azalea and that is why Utsunomiya has become the center of Satsuki azalea culture. Before the discovery, we had to prepare soil, crumbling and sieving red clay after it was well dried, and still the plants grew very poorly and required much care. It was not easy to grow 100 Satsuki azalea bonsai, to say nothing of 1,000.

The sphagnum moss should be chopped finely and sifted through a sieve of $\frac{1}{8}$ -inch mesh before being mixed with the soil. Instead of sphagnum, mosses grown on the mountains are often preferred, particularly for young bonsai. Sometimes coarse sand is substituted for these mosses when they are not available. If the plants are in unhealthy condition because of overfertilizing, decaying roots, etc., reduce the amount of leaf mold when preparing the soil for repotting. Before being used, the mixed soil should be sorted into two or three grades differing in size of particles, by sifting through sieves having meshes of various sizes. If it is divided into two grades, the coarser-grained should be placed in the container first, filling it two thirds from the bottom, with the remaining third filled with the finer-

grained soil. If three grades are used, the coarsest should be used for the bottom third of the container, the medium grade for the middle third, and the remainder filled with the finest-grained soil. Finely pulverized soil should never be used; the smallest soil particles should be removed by sifting, and thrown away before the soil is mixed.

Repotting is best done just after flowering—mid-June to early July at Utsunomiya. It is also sometimes done in spring, before the buds burst. Autumn repotting is not so good. It is not necessary to repot every year, but only when the plants are found to be pot-bound.

The fertilizers used mostly are soy bean cake, rape cake, and dried fish (herring cake, etc.). These are pulverized and placed on the surface of the soil in the container, a small quantity once or twice every month. These fertilizers should be mixed in varying proportions according to the age of the plants and the season in which they are applied.

Water is given to young plants three or four times a day in spring, summer, and autumn; to old plants, twice a day, in the morning and in the evening. In warm weather it is good to syringe the plants.

Exposure. A sunny and well ventilated place is the best for growing Satsuki azaleas, but in the height of summer they should be in partial shade; I place them under a marsh-reed screen. The more they are exposed to the sun, the better they grow and the thicker the trunk and branches become; therefore to the extent that one can afford the time and effort, they should be watered liberally in order that they may thrive even under the hottest sun. With the approach of freezing weather (in November at Utsunomiya), keep them in a sunny place and prepare the frost cover.

Propagation. Satsuki azaleas for bonsai are propagated by cuttings. When the young shoots attain a length of $2\frac{1}{2}$ to

*Kanuma soil is light yellow in color, crumbly, light in weight, porous, and granular; it absorbs water quickly. You may imagine it to be like soil treated with Krilium or similar soil conditioners; such soil can be substituted for Kanuma soil.—Guest Ed.



←
Azalea KODAI-
NISHIUKI.

↓ Azalea SATSU-
MA-BENI.

4 inches and are somewhat hardened (that is in May or June), the shoots are cut off, a few leaves at the bases removed, and the bases recut on a slant and placed in water for two or three hours. These should then be inserted 1 to 2 inches apart and an inch or so deep into a mixture of 4 to 5 parts of Kamima soil and 3 parts of chopped sphagnum moss. Generally they should root in thirty to forty days. After remaining for fifteen to twenty more days in the cutting boxes or pans, they should be transplanted into soil prepared as described above for young plants. Two weeks or so after this, fertilizer is placed on the soil to encourage growth. If liquid fertilizer is preferred, it must be very dilute, otherwise the fibrous roots often become damaged and may decay.

Training the Plants

Forms. Training Satsuki azaleas as bonsai is most interesting. The forms





Azalea HINO-TSUKASA.

into which they are trained vary according to one's taste and the nature and shape of the plants used. Some of the popular forms are upright single-trunked, upright two-trunked, cascade, several-trunked, several plants potted together, and elasping-stone style. All the training should be carried out gradually, giving consideration to the nature of the azaleas and one's taste. The best times to practice training are just before or just after flowering or from mid-September to October. If training is done in the earlier season, the branches will be fixed and the plants can be released from the copper wire coils in the autumn.

Wire. Six or seven kinds of copper wire are used, selected from No. 1 to No. 23, according to the thickness of the trunk and branches. The wire is well burned in a rice-straw fire before being used.

Starting the training. It is better to start the training while the azaleas are young, say 3 to 4 years from cuttings,

or 1/3 inch or so in diameter at the trunk. In these azaleas it is not difficult to curve the trunk as one wishes, coiling No. 10 copper wire around it. To the branches No. 12 to No. 20 wire is applied, according to their thickness. The copper wire should never be coiled around the trunk and branches too tightly, as it may damage or even kill them. As a precaution the trunk and branches may be covered with hemp fiber before training with the copper wire. If bending at an acute angle is desired, great care must be taken, as breaking will easily occur at the point of bending.

Trimming. All Satsuki azalea bonsai should be trimmed just after flowering, as the new growth breaks the harmony of form or becomes too dense, or shoots that are too strong are produced. If such undesirable growths are cut off or shortened, other new growths may be produced at the point of cutting, and if they are not produced too late, they will form flower buds.

Greenhouse plants. Young azaleas grown in the greenhouse are easier to train into any desired shape and to bend very sharply.

Aims. Satsuki azalea bonsai fanciers can be divided roughly into two classes: one group appreciates chiefly the styles and shapes of the plants themselves; the other is interested mainly in the blossoms. The latter group can be again divided into two; some of them are interested in the size of the individual blossoms, the others in the colors and markings of the flowers.

To really appreciate the styles and forms of the shrubs, one must have aged and well trained plants, and so Satsuki azalea bonsai have not become every man's hobby. However, starting with several-year-old young plants obtained from nurseries or raised by yourself from cuttings, you can easily train them and in a few years obtain very nice dwarfed plants, tastefully branched. In the course of training these, you will find much of interest and enjoyment.

A BONSAI OWNER IN NEW YORK CITY

While Dr. Herman F. Froeb was with the Medical Corps in Korea, his wife lived and worked in Tokyo. Shortly before returning to the United States Dr. Froeb joined Mrs. Froeb in Japan. On a visit to a bonsai nursery in one of the suburbs of Tokyo they saw a lovely little Sargent's juniper bonsai (*Juniperus chinensis sargentii*) and decided to bring it home, with the happy result shown in these pictures. The tree survived in spite of having all the soil washed from its roots (United States Plant Quarantine Regulations) and having the roots packed in damp moss during the long journey to this country. The little tree, over 60 years old, is now happily at home in Peter Cooper Village in New York City.



Louis Buhle photos

↑ Mrs. Herman F. Froeb sprinkling the foliage of the Sargent's juniper bonsai she and her husband brought from Japan.



A closer view of the juniper. Its luxuriant dark green foliage contrasts beautifully with the gnarled gray trunk and brown container.



Single small-flowered chrysanthemums grown in cascade and bonsai styles.

CHRYSANTHEMUMS, BONSAI STYLE

Beautiful bonsai plants in one year

Kan Yashiroda

SINGLE small-flowered *cascade* chrysanthemums, so called because they have been grown for many decades in the cascade style in pots, are popular among bonsai and chrysanthemum fanciers for training into the style of bonsai.

In growing trees as bonsai, starting from seeds, cuttings, or young nursery-grown stock, one must wait many years to have an appreciable bonsai—though the years of growing and training are certainly not tiresome. Bonsai from cascade chrysanthemums are completed within a year, and there are few bonsai that are so floriferous for so long a time or have such lovely blossoms.

The customary cascade chrysanthemums are trained in a long triangular shape, falling just like a cascade in front of the

container. Some of these are shown in the accompanying photograph.

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to spruce on page 156. These bonsai of cascade chrysanthemums are very nice as bonsai, but the loveliness of the chrysanthemums is somewhat lost. It seems to me that this is making use of the chrysanthemums as bonsai for the sake of bonsai as such. While writing these lines I recall the words of that great adventurer and photographer, Martin Johnson: "No artificial drama, humor, pathos, suffering, triumph, joy, or grief ever held the vividness of Nature's own."

The two cascade chrysanthemums shown in the photograph succeed to some degree in keeping the loveliness of shape and flower while making fine chrysanthemum bonsai. Compare them with the bonsai of Satsuki azaleas SHINNYO-NO-TSUKI and MATSUNAMI which have been grown by Mr. J. Nagao, an expert bonsai grower. Azaleas attain these shapes only after at least twelve years of growing and training, while the two chrysanthemum bonsai were developed within ten months from the time of planting the tiny suckers.

Clasping-stone Style

Another popular way of growing cascade chrysanthemums as bonsai is to plant them on stones and then train them.

Volcanic stones are preferred for growing cascade chrysanthemums as they are porous and light. Ones that are somewhat water absorbent are selected.

When to begin. In early March, or even before, the suckers are planted in shallow boxes; and when well rooted they are potted singly in 5- or 6-inch pots. They are ready to plant on stones in mid-April or early May. (Experience tells us that in Japan good plants are never obtained if they are planted later than early May.) They will show several thick white roots lying near the surface of the soil and having no branching or rootlets. These roots are the kind the operator desires, to grow downward, clasping the surface of the stone, right into the soil in the container in which the stone is placed. If the plants have been grown in the pots too long, the roots are



Satsuki azaleas. Above: SHINNYO-NO-TSUKI;
below: MATSUNAMI.





Chrysanthemum OGURAYAMA growing on a stone.

pot-bound and abundant, so they would be too bulky to be planted in the hollows or crevices of the stones. If taken from the pots too early in the season, only some short roots are produced near the surface of the soil.

Preparing the Stone. The chrysanthemum soil mixture is placed in the container and the selected stone put in it. A rich and somewhat pasty soil mixture is put into a hollow or other suitable place on the stone where the plant may be anchored. Small amounts of this soil

are also pressed or pounded into other cavities, dents, and crevices along which the roots may eventually grow down into the container.

Planting. The plants are taken out of the pots and the attached soil very carefully removed from the roots. Most of the roots are cut off, leaving only a few of the thick ones that have been produced near the surface of the soil. The prepared plant is placed in the hollow or other chosen spot on the stone, and each root is very carefully placed



Back view of plant illustrated on opposite page, showing the thick stem-like roots growing down into the container.

on the soil and covered with more of the same soil. To protect the soil on the stone from sun and rain, sphagnum moss is placed over it and hemp-palm rope or manila hemp rope wrapped around the moss and the stone. Other ways of holding the moss and soil may be devised, each grower using the means and materials he thinks best.

Exposing the roots. When the roots have spread and grown well down into the container, say late in September, the hemp rope is removed and the soil is

washed off the roots. This is not done all at one time, but little by little, starting with the upper parts and gradually progressing to the lower ones, with intervals in between. It is no exaggeration to say that when the roots are revealed as the soil is washed off, and their development is found to have fulfilled one's intentions, one is intoxicated with joy! The photograph clearly shows that the thick, stem-like roots firmly clasp the stone and grow down into the soil of the container.



Chrysanthemum SHIRO-UMA, or WHITE HORSE, growing on a low stone.

Training and trimming should be practiced in the same ways as already described. Also some hints from the other articles on bonsai in this issue might be applied to chrysanthemum bonsai.

Planting on a low stone. The photograph shows a dwarf cascade chrysanthemum bonsai planted on a low stone; it has low-hanging, spreading leaders on all sides. For a beginner, planting on a low stone is easier, but care must be taken not to let the chrysanthemum get too vigorous in growth. Sometimes when collecting plants in the mountains I come across some wild chrysanthemums, wee tidy plants, flourishing bravely in dry pockets on a perpendicular cliff. Gazing at the dainty pure white flowers standing a little above the thick grayish-green foliage against the clear autumn sky, I passionately wish to grow a model of these plants in a container with a little piece of the very cliff itself.

Watering. In trying these chrysanthemum bonsai grown clasping a stone, watering and frequent syringing of the parts where the roots grow or will grow

should not be neglected throughout the growing season.

Decorative glazed containers can be used to replace the unglazed containers for exhibition and for home decoration. They should be chosen to harmonize with the plant, the stone, and the surroundings.

For some years after I contributed an article on "Cascade Chrysanthemums" to *The Gardeners' Chronicle* of England, a long time ago, many customary-shaped cascade chrysanthemums about which I wrote were tried, regularly exhibited, and even sold in the markets in Europe and America. I think that now cascade culture is not practiced so much as before, and chrysanthemums are grown mostly in bushy form like ordinary herbaceous plants. Now that bonsai and the Japanese way of flower arranging are being practiced overseas and are influencing fanciers in other countries, I hope that cascade chrysanthemums will be grown and trained in the ways of which I have tried to give you some idea.

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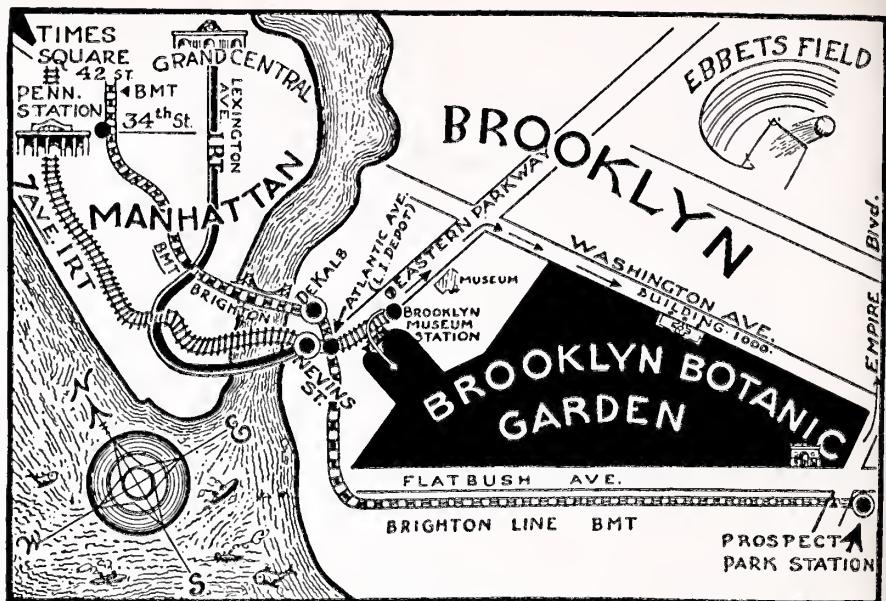
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No. 4

AMONG THE CONTRIBUTORS TO THIS ISSUE

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FRED J. NISBET, Editor, *American Rose Magazine*, Columbus, Ohio.

JOHN B. STRANDER, horticulturist, associated with Strander Evergreen Nurseries, Seattle, Washington.

KATHRYN S. TAYLOR, author, teacher of horticulture, President of the New England Wild Flower Preservation Society.

PETER J. VAN MELLE, late head of the landscape department of the Poughkeepsie Nursery Company, writer, lecturer, authority on woody plants; word of Mr. Van Melle's untimely death on December 8 reached the Botanic Garden as this issue was going to press.

OLIVER K. WHITING, traveler, writer, member of the faculty of the Carnegie Institute, contributor to the British Broadcasting Company, the National Broadcasting Company, and the *New York Times*.

PLANTS & GARDENS

Adams-needle (*Yucca filamentosa*)

VOL. 9

Winter, 1953-54

No. 4

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Editorial

HESTER M. RUSK, PETER K. NELSON, CONRAD B. LINK, and the Editorial Committee of the Brooklyn Botanic Garden.

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NOTICE OF CHANGE OF ADDRESS AND ALL OTHER CORRESPONDENCE

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Storm of January 10 brings heaviest snow to Botanic Garden since 1947.

Except where otherwise credited, photographs by Louis Buhle

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES
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Winter 1953-54

After devoting three of the year's issues of PLANTS & GARDENS to special subjects, we count it a privilege in this fourth number to publish our selection of articles of lasting interest — from the entire field of non-technical gardening and horticultural literature for 1953. We consider it a privilege because without the warm cooperation of all publishers and authors, this special digest-of-the-year would not be possible.

The only article that has not previously appeared in print is by Botanic Garden Member Jean Marcel Aubert of Switzerland. We commend it — especially to those people whose wanderings have led them to remote places of great natural beauty, places to remember.

Most, but not all of the articles have to do with methods, even to the simple pursuit of garden watering. We strongly recommend them for "required reading."

Stone Age Plants in the Atomic Age (p. 273) is not a gardening article, but is one of the most thought provoking presentations we have read in a long time.

Sincerely yours,

George S. Avery, Jr.
Director

THE IMPORTANCE OF PLANT MATERIALS

*Plants are the basic building blocks of the garden—
design should revolve around the plants to be used*

John B. Strander

Condensed from *Arboretum Bulletin*, Summer, 1953

THE propagation and growing of plants, known as horticulture, is one of the oldest arts of man. The use of plants to create functional and beautiful areas of land, called landscape architecture, is possibly equally old. In fact, according to one contemporary authority, the first practicing Landscape Architect was He who created the Garden of Eden.

Gardening a Part of Total Culture

Gardening is only one facet of that mass of interlacing creative activities which combine to provide the culture of the period. Music, literature, sculpture, architecture (and the base, philosophy) make up the major portions. Gardening itself progresses and declines in a line roughly parallel to the others. At some periods it becomes the most important, in others it lags. Each generation has expressed itself and added its own response to the romance; each has built its own living creations tied intimately to its people's needs.

To retell the story of landscape architecture is not necessary in order to show the importance of plant materials. In every age, and at every time, the basic building block of the garden has been the plant materials. No matter the use

of the garden, nor its extent, nor its planned permanency, the design has always revolved around the plants to be used. Those plants may have been simple natives or rare importations, and the over-all plan may have promised only a dooryard grouping—or an extensive arboretum.

With the advent of the new art, begun in painting and rapidly spread throughout other mediums, gardening also forgot its old measures and began to look for new modes of expression. The geometry of the formal was too unyielding to fit the architecture. The informal was too indefinite and the naturalistic had slipped into disuse.

In the beginning there was much experimentation; units of the old form were lifted bodily and compressed into strange concrete borders with most odd and meaningless result.

It was not until the "outdoor living room" with its terracing was developed that we had a logical base from which to start. Then came the much advertised theme of "living from boundary line to boundary line." A freedom of line was developed, actually very formal, yet planted with soft and tropical-appearing broad-leaved evergreens.

Published by the Arboretum Foundation, University of Washington Arboretum,
Seattle 5, Wash.

No visual art other than landscape design "allows one the combination of daily change along with relative permanence."



Gottsch

The combination was good, it was fresh, and was the mark of our contemporary. It fitted the multitude of new materials being developed by our builders, and complemented the stark, strong lines of our newer buildings. At this point we had a new expression.

Time to Evaluate Trends

Early as it may be for evaluating, it is time to examine what is going on and in which direction we are aiming. Year by year our landscape techniques become more commercial, our construction more regular and factory-like. The original experimentation is finished, and rules are replacing free thought. American formal teaching in the field is swinging from an emphasis on horticulture to an emphasis on design. The result is gardens without plants, save a few container-grown "showpieces." Yes, design is important—but in a garden it must come from leaf and branch, and not from wood and steel.

This system results in low maintenance, and in a great deal of saved space. It also solves the problem for those who have no interest in growing plants.

It also results in a complete reversal of all things which gardening stands for.

Landscape Design a Unique Art Form

Let us examine our subject. There is no visual art similar to landscape design. No other form of expression allows one the combination of daily change along with relative permanence. The static forms of sculpture, the colors of painting, the fleeting grace of dance—all combine in landscape. The mysteries of botany and the feeling of nature are also present. When we now subtract the most important element of all—the plants—the remainder is somewhat lacking.

Without plants there can be no garden. By this we do not mean the use of plants to build a promiscuous "jungle"; quite to the contrary, a strong restraint is always necessary that each specimen be given its just space. What we do mean is that to construct a garden from "gravel and asphalt," no matter how well it fits the house, is to have no garden at all. In our haste to have our homes extend to the property line we overlook the fact that a garden and house can never be one and the same. We can join the two, we can make the house look as if it belonged, and we can interlace a spreading home into an integral part of the garden—but we cannot substitute.

HOW DO YOU RATE AS A GARDEN WATERER?

*You can measure your own performance
against these proven laws of watering*

Condensed from *Sunset*, July, 1953

HERE are four basic rules for garden watering. We state them flatly here; we will qualify them as you read on.

One. Don't water lightly. Water until your soil is saturated to your garden plants' root depth. Then stop.

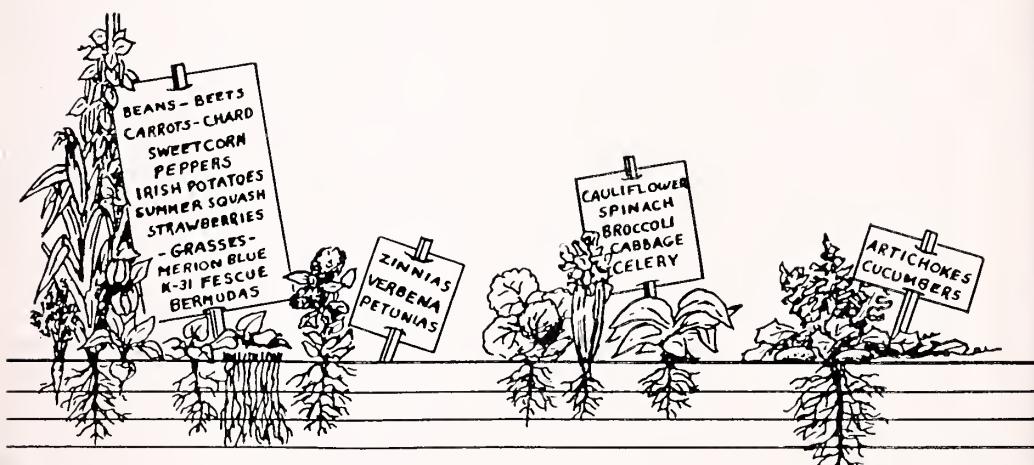
Two. Don't water again until your soil

is almost dry.

Three. Water all of your garden soil. Don't count on lateral distribution of water.

Four. Don't water any faster than your soil can absorb water. If you do, the excess will simply go to waste.

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A Little Water Wets Only a Little Soil; You Can't Half-water Soil

Water moves down through the soil by progressively satisfying the water-holding capacity of every soil particle. When every particle in the first inch of soil has its clinging film of water, additional water becomes "free" water. It's free to move down to soil particles in the next layer.

You can't "dampen" soil to any depth by watering it lightly. You can have a damp soil only by wetting it thoroughly, then allowing it to become partially dried out.

Each Soil Type Has Its Own Water-holding Capacity

The best ways to find out how deep the water will go are to measure the water delivery of the hose you are using and to sample the soil at various depths with some type of soil probe.

If you are willing to work on averages, you can follow these:

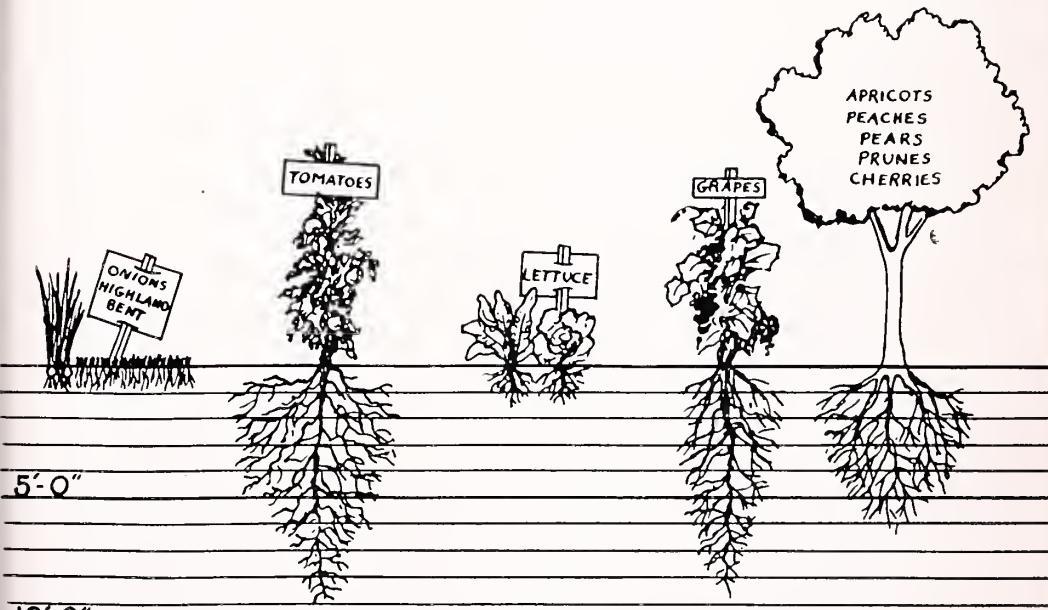
Sandy soils are made up of particles many times larger than clay soil particles. Loamy soils are in between the two, with a mixture of sizes. The smaller the particles of soil, the more water it takes to cover them.

If you are using a sprinkling system on a lawn, you can measure inches of water delivery by placing a number of coffee cans at equal intervals in a line running out from the sprinkler. Note the time it takes to fill the cans to one inch.

The time that the sprinklers should be on is easy to calculate. But how can you measure the results when you walk around with spray or watering stick, or with your thumb over the end of the hose? The irrigation experts have an answer to that one which should surprise the quick-watering type of gardener.

The delivery of a $\frac{5}{8}$ -inch hose turned on full is 5 gallons a minute under average pressure. You can check the delivery of your hose with any convenient bucket for measuring.

Redrawn from Sunset



At 5 gallons a minute, it takes 50 gallons, or 10 minutes, to fill 100 square feet of sandy soil to 1 foot in depth.

It takes 100 gallons, or 20 minutes, to fill the same amount of loam.

It takes 150 gallons, or 30 minutes, to fill the same amount of clay.

The above timing assumes that the soil will take the water that fast—which may not be true with clay.

Now let's apply that time table to a flower border 4 feet wide by 25 feet long. Let's assume that the soil is clay. If you wanted to wet the soil in that bed to a depth of 2 feet, you would have to walk back and forth with the hose on full force for 1 hour.

Deep Watering Stimulates Deep Root Growth

The depth to which plants will exhaust the available moisture is tabulated in the diagram on pages 234 and 235. All depths shown for agricultural crops are from measurements made by the University of California.

Root depths of ornamental plants were determined from a combination of various sources and our observation.

These measurements and estimates of root depth are based on deep soil in areas of low rainfall. Where rainfall is high, root depths of the very deep rooting plants are often shorter.

The majority of garden plants can work on water in the 2-foot and deeper level. Yet the watering program of most gardeners is based on a root depth of one foot or less.

Shallow Watering Creates a Shallow Root System

Roots develop where there's water, soil, air, and nutrients. If all are present in an area of deep soil, the root system will be as deep as the plant can make it (some plants such as camellias are naturally shallow rooted). If only the top foot of soil is kept watered, the roots of all plants will develop as best they can in that top layer.

One of the most dramatic demonstrations of depth of rooting and its relation

to watering was made on lawn grasses at the University of California at Davis. Dr. Robert M. Hagan reported the experiment as follows:

"What are the rooting capabilities of lawn grasses? The rooting depths of a 15-month-old planting in a deep clay soil were studied . . . measuring the extraction of soil moisture. The plots were irrigated deeply and then allowed to go without irrigation until the grasses wilted. When wilting occurred, all of the available soil moisture in the following soil depths had been extracted:

Grass	Effective rooting depth (inches)
Chewings Fescue }	10-12
Illahee Fescue }	
Highland Bent	12
Kentucky Bluegrass	30
Merion Bluegrass	30-36
K-31 (tall) Fescue	36+
Bermudas (U-3 and Common)	36+

Of course, rooting depths will be less in shallow soils. These data simply indicate the rooting capabilities of grasses.

"The possibilities of infrequent irrigation were studied with temperatures above 90° and close to 100° most days, with low humidity. In deep clay soil, the 15-month-old grass plots did not show distinct wilt until the following periods had elapsed.

Grass	Elapsed days before distinct wilting
Creeping Fescues and Bent	14
Kentucky Bluegrass	24
Merion Bluegrass	30
K-31 Fescue	36 (app.)

"After these periods, the grasses were distinctly wilted but had not turned brown. These data indicate that where grasses are deep rooted they can go for long periods between irrigations even in the hot, dry interior valleys."

How Much, How Often?

How much water depends upon soil type and root depth of plants.

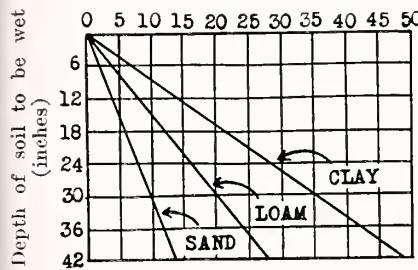
How often is estimated by how long the supply of available water in the soil reservoir will last.

The rate of use is based on water use of the plant—transpiration of leaves plus that lost by evaporation from the soil.

The rate of use depends upon many things—light intensity, temperature, humidity, and wind. It is influenced by the amount of planting, and competition from the roots of other trees, shrubs, and grasses.

If the *use* of 1 inch per week is charted against root depth of grasses in lawns, you get this picture:

Number of days between watering



How to read chart: If you are watering a lawn where rate of use averages 1 inch per week and root depth is 12 inches and soil is loam, catch the 12-inch line and run across the chart to the loam diagonal where you read off approximately 7 days. If your soil is in the clay class, the chart says that for a 12-inch depth the interval could be 14 days. Since this figure is based on cool climates (1 inch used per week), the interval would be cut to 7 days in hot climates (2 inches per week).

If you are now watering every other day, you will insist that the chart is good theory "but they don't know my lawn."

It is very true that you can't change from an every-other-day interval to a twice-a-month interval in one jump. If water penetration and drainage are good, you can get subsoil moisture by increasing the length of each irrigation.

Avoid the Run-off Problem

If subsoil is dry despite adequate amounts of water, you may have a run-off problem. On a heavy soil, the penetration of water can be so slow that more than 50 per cent of the water is lost by run-off if there is the slightest slope. In other words, you could easily sprinkle on 6 inches of water and get only 3 inches into the soil.

There are several ways to overcome this condition.

You can have the soil aerated. On some soils, spiking will work wonders; but on a heavy clay soil, you are likely to compact the soil around the holes you drive and lose all the benefit of spiking. The spiking tools that remove a core of earth don't have this fault, but some clay soils are so tough you cannot use this type of tool.

You can aerate the soil and add gypsum (up to 10 pounds per 100 square feet) to improve water penetration.

A bottled lime sulfur spray product is available which acts on alkaline soils as liquid gypsum.

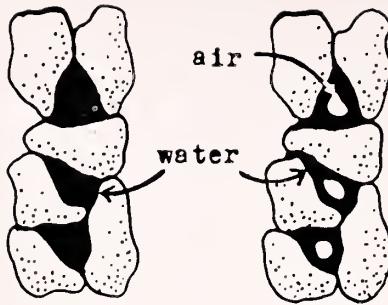
The most difficult job will be to cut down the sprinkler delivery to match the water absorption of the soil. Many sprinklers on the market put on more water per minute than the very heavy soils will absorb.

Another way to lick heavy soil run-off is to operate the sprinklers until run-off starts, and then shut them off for a half-hour interval. Turn them on again until run-off starts and then shut off. Continue this on-and-off sequence until water seeps to desired level.

"Free" Water is Dangerous

The danger of overwatering comes from the build-up of free water in the soil. When water fills the interspaces, the supply of oxygen is shut off and the plant begins to drown.

Any reduction in oxygen supply below the requirements of the roots for respiration has a direct effect on growth. Nutrient absorption and rate of elongation of the roots are greatly reduced. Also when the soil is low in oxygen, the wrong kind



Redrawn from Sunset

Saturated soil (left) contains no air; as soil dries out, air spaces appear.

(Water shown in black.)

of bacteria thrive and the right kind die. Roots become more susceptible to attack from fungi, bacteria, and salts.

Alternate Wet-Dry is Beneficial

When the gardener gives the soil a deep soaking, each layer of soil is wet to *field capacity* as the water drains through the soil. (Agriculturists say that when a soil holds all the water it can against the pull of gravity it is said to be at *field capacity*.) At this point each soil particle has its own fat film of water, and the air space in the soil is at its lowest percentage.

In the days following, the plant roots and evaporation draw water from the films, and more space is gained for entrance of soil-air and oxygen.

The agricultural experiment stations recommend that the interval between irrigations be based on the time lapse required to deplete the soil moisture from field capacity to approximately the wilting point.

Don't keep the soil at field capacity. Where roots are deep and soil is heavy, stretch the interval between watering. When irrigations must be frequent, because plants are naturally shallow rooted, or have a very high transpiration rate, be sure the soil is porous.

Ways to Apply

Some general rules apply: The more water outlets you scatter around the place, the better watering job you will do. Noth-

ing discourages thorough waterings more than dragging long lengths of hose. Try for 25 feet of hose at four stations rather than 50 feet at two. The more automatic equipment you have, the more likely you are to keep the garden watered.

In watering trees or large shrubs, an ideal way (but not always a convenient way) to get water to the proper depth is to build a basin as large as the full spread of the tree at least 6 inches deep. Remember that the greatest root action is at the "drip line" of the tree—the outer edges. Make the dike a few inches beyond the drip line.

Don't assume that water spreads out horizontally underground. There is very little lateral movement of water in soil. Keep this in mind in building basins or ditches. A basin around the trunk of a tree will tend to keep the roots in a very small area. Water in a ditch 6 inches or more from a row of vegetables will not water the entire root zone. Soak every square inch of soil.

In dry areas where water is scarce, many gardeners husband water by sinking perforated tin cans around a plant. This method saves by cutting down evaporation and wasted water from run-off. But don't expect a plant to concentrate its root system at one point; use a circle of cans. Some gardeners sink drain tiles vertically around large shrubs and trees to get deep penetration without water loss.

Overhead watering has many advantages. It distributes water over the entire soil surface. If gently applied, it is the best way to get water on sloping ground.

Contrary to a wide-spread belief, there is no danger of burning leaves if you put water on them while they are in the sun. Overhead watering reduces insect damage, especially red spider.

Many gardeners now water everything in the garden with set overhead sprays. In areas of high humidity, it's best to avoid late evening watering, but morning overhead watering will actually reduce mildew rather than increase it.

A GARDEN OF FRAGRANCE

For those who cannot see

Oliver K. Whiting

Reprinted from *The New York Times*, October 25, 1953

THE City of Brighton on the south coast of England has commemorated this Coronation year by building a garden designed for the special enjoyment of the blind. Led by Curtis Wilson, who has been totally blind since World War I, many organizations and individuals have helped to make this garden of perfumes. The guide rail bordering the paths was given by the Soroptimist Club; teak tables and chairs by the Rotary Club. Another organization presented the shelter. Its roof consists of tiles 400 years old which were collected from the bombed church at Lymminster, and was built as a labor of love by a retired 74-year-old bricklayer.

At the entrance a visitor takes the handrail, which leads to the stone shelter, and on past sixteen seats, each set back from the path among the flowers. At intervals along the rail hang tablets that give the names of the flowers in Braille and raised letters of brass. The rail-edged path, whose graveled surface announces anyone's approach, guides the stroller to a small flagged terrace. Here in the center of a round stone table grow



Photos author courtesy

Embossed roman and Braille labels can be read by blind visitors.

scented geraniums, whose leaves, when crushed, release the odors of peppermint, lemon, orange, and cinnamon. They are pleasant to touch and easy to reach. Between the flagstones are patches of camomile and thyme which give off their fragrance as they are crushed under foot. On past this table of flowers the path leads under the shelter of an old flint wall, from the top of which hang honeysuckle and roses. All in all, this fine acre-and-a-half garden has been planted with the greatest number of fragrant flowers ever collected.

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Maxham

These near-century-old lemon-lilies (*Hemerocallis flava*) belonged to the author's mother.

HEIRLOOM PLANTS

Fine plants handed down from generation to generation are treasured possessions

Naomi M. Ingalls

Condensed from *Flower Grower*, December, 1952

IT'S always a happy occasion when a friend invites us to her home and proudly displays the family heirlooms—a once-busy spinning wheel, a highboy, perhaps a grandfather clock. I am usually beguiled into telling about Aunt Marinda's thin silver spoons and Great-aunt Ieybinda's silk and satin quilt. And then no longer able to refrain from speaking of green, growing things, I add: "We also have some *living* heirlooms—keepsake plants. There's the red 'piney' and the white roses, which belonged to Aunt Hester. They're more than 100 years old."

Childhood Recollections

One of my earliest childhood recollections is that of tiptoeing to the window at daybreak to count the dozens of these snowy roses which had opened during the night. This rose bush (*Rosa alba*) grew beside a mossy stone wall. There were also bushes of the lovely China rose OLD BLUSH and a row of low-growing semi-double scarlet roses. Across the narrow road which ran by the house, Mother's loved daylilies (*Hemerocallis flava*) neighbored with a stand of pungent golden-buttoned tansy (*Tanacetum*), while

plumes of gnarled, ancient lilaes perfumed each succeeding spring. The pleasant ginger mint or striped bergamot (*Mentha gentilis variegata*) with its yellow-striped leaves made a pretty carpet around the big doorstone, a spicy odor arising whenever one of us brushed past. Years ago, an old resident, gray-haired and stooped, told us that these perennials had been growing on our farm long before even my parents moved there 66 years ago. So these rugged plants must have weathered the vicissitudes of our climate for nearly a century. Although the old farmstead is now deserted and its buildings long since gone, lilaes, herbs, daylilies and some roses still carry on there—neglected but always beautiful, year after year.

Plants Still Growing

Today, in our own home garden, divisions from these plants from the old family farm may be seen growing happily. The numerous offspring of a 70-year-old plant of Jacobs-ladder (*Polemonium caeruleum*) are valued not only for the memory they evoke of wide stretches of sky color beneath olden apple trees but also for their adaptability. We love the delicate bell-like flowers and place clumps of the plant in various nooks and corners. The planting beneath a spirea is especially charming.

The fragrant, double white narcissus (*Narcissus odorus plenus*) in our garden are divisions from clumps a century old. The strawberry bushes (*Symporicarpus*) and the "syringas," as *Philadelphus* was often called in earlier days, are as old as the narcissus, but the cobbler's bench (*Lamium maculatum*) is a mere 50 years old. Here in Vermont, the latter is often called snowflake mint because of the distinctive white mark in the center of the leaf.

Farther down our garden spaces, gay VON SION daffodils nearly a century old wave golden bonnets, brightening the greenery like tethered sunbeams. And although more than 70 summers have witnessed the deep pink blossoming of our prized ROSE DES PEINTRES moss rose, it is still carrying on.

Friends' Heirlooms

To me, it's always interesting to hear about friends' heirloom plants. Thus I was pleased when Violet G. Wheeler described the annuals and roses which originally flourished at the home of her grandparents, Mr. and Mrs. Deliverance Wheeler, Sr., of Readsboro, Vermont. The roses, the red semiclimbing HARRIET, the cabbage rose (*Rosa centifolia*), the China rose OLD BLUSH and the black *R. gallica* CARDINAL DE RICHELIEU, were inherited by her. All but one of these 62-year-old specimens still produce blooms.

A clump of 100-year-old double white narcissus still perfumes its corner of the garden.





In a Vermont dooryard this German iris (*Iris germanica*) has been growing for 75 years.

In the same village, Mrs. Gilbert Ross cherishes two 60-year-old plants; pink, yellow and white Scotch roses (*Rosa spinosissima*) and the herb lovage (*Lavisticum*).

In Ludlow, Vermont, Mrs. Albin Nelson inherited clumps of pretty lavender phlox, the lifetime treasure of her aunt. Mrs. Nelson also has a lovely century-old pinxterbloom azalea (*Rhododendron nudiflorum*), which never fails to form a cloud of fragrant pink blossoms each spring. Also in Ludlow, Miss Abbie King, who is of an advanced age, cherishes her mother's madonna lilies (*Lilium candidum*). Formal and stately, the plant grows at the side entrance of the old home, laden with waxen trumpets of purest beauty.

An Unusual Specimen

An old farm on North Hill, Ludlow, boasts an unusual old specimen for the North—an 80-foot magnolia tree. Every April, many folks come to view the blossoms, which are the shape and size of saucers and appear before the foliage. The story goes that a young man of the village who served in the Civil War, William Livingston, carried back magnolia seeds with him when he returned. From one of these sprouted the noble specimen standing today.



Photos author courtesy

Near by is an equally aged MME. PLANTIER rose.

Mr. and Mrs. John White, Jamaica, Vermont, own many aged shrubs and plants. Many people are of the opinion that these shrubs were planted about 1832, when the house was built by Mrs. White's grandfather. To quote Mrs. White: "These growing things were old when I was young, and I am more than three score and ten." The red *Rosa centifolia* PROVENCE ROSE and the lovely white MME. PLANTIER rose are as sweet as in bygone days, and the cream-colored flower-de-luce (*Iris germanica*) still glows serenely in its nook by the front door.

All are centenarians. We viewed two old apple trees (*Malus sylvestris* SPICE APPLE) more than a century old and still bearing fruit. By the doorstep is a 74-year-old HAPPY THOUGHT *pelargonium*, called mother's geranium because many have been the slips it has furnished throughout the years.

But of all these heirloom plants of ours, perhaps the one which nudges my imagination the most delightfully is the dames-violet (*Hesperis matronalis*), whose seeds have been handed down in our family for years. On spring evenings in our garden, the sweet perfume from its tiny "unseen censers" of pink, lavender, purple and white revives tender memories of other scenes, other days.

CHEMICAL SOIL CONDITIONERS

They cannot quite perform miracles. Amazing claims—mostly false—have been made. Actually, the truth about what they can do is wonderful enough

Joseph E. Howland

Reprinted from *House Beautiful*, March, 1953

CHEMICAL conditioners can work limited wonders if you use them right:

1. Dust or spray conditioner over any good soil *after* sowing seeds. Then the soil stays loose and crumbly, lets seedlings pop up easily because a tough crust won't form no matter how pounding the rain or how baking the sun. Sloping soil

won't easily wash away.

2. Mix conditioner into top six inches of a greasy, sticky soil that won't grow good plants, and you convert it into loose, open soil resulting in wonderfully vigorous plant growth.

Now let's see what was wrong with ten wild claims made last year about chemical soil conditioners:

Copyright, 1953, by Hearst Magazines, 572 Madison Ave., New York 22, N. Y.



Untreated clay soils pack so tightly that seedlings may die before getting through the crust.



Treated soil remains loose, ideal for easy emergence of seedlings.

Photos courtesy House Beautiful

Claim: Breaks up hard-packed soils.

Truth: Sprinkling conditioner onto hard, packed soil softens it and makes the surface look spongy—but this lasts only until the first rain.

Permanent soil improvement involves three steps:

1. Loosening the soil mechanically
2. Keeping the soil loose and porous
3. Increasing the plant food content

Chemical conditioners can perform only step 2. Breaking the hard soil into small lumps (like coarse sugar) is the job of plowing and cultivating. Only this produces a light, fluffy soil. The need is to maintain this condition, because the small lumps tend to disintegrate into individual clay particles and pack tightly together. The chemical soil conditioners give each lump of soil a coat of "glue" that keeps it fixed in its fluffy state. Step 3 remains—increasing fertility of the soil—and this requires plant food. *Chemical soil conditioners have no food value.*

Claim: No work involved.

Truth: Soil must be plowed and cultivated as usual before or during chemical conditioning.

Claim: Replace peat and humus.

Truth: Peat and humus contribute three

things: 1. a "glue" which is supplied by the chemical conditioners; 2. a small amount of plant food; 3. physical bulk which dilutes the soil, helps keep it loose by holding soil particles physically apart. Chemical conditioners do not contribute 2 or 3.

Claim: Improve any soil.

Truth: Useless in most sandy soils (the soil particles are so big that they don't pack together anyhow). Useless in soils rich in humus (already contain enough "glue"). Of little value in certain kinds of non-greasy clays.

Claim: Improvement is permanent.

Truth: The oldest experiment station tests (Dr. William Martin's at Ohio State University) are only three years old, and the improvement from a depth application of conditioner to a real problem soil has all but disappeared. This is a farm field, subject to heavy tractors and intensive mechanical cultivation.

Not all soils behave alike, of course, but we can guess that the depth treatment of a problem soil can be expected to last three to five years under home-garden conditions where the soil is spaded or plowed only once a year.



Soil should look like this just after planting. The problem is to preserve this loose, spongy condition.



Untreated soil clumps into a tight mass when wet, especially after prolonged spring rains.

Good soils need only the inexpensive surface treatment, but this must be done annually, of course.

Claim: Gives new life to old lawns.

Truth: Only if soil is loosened mechanically, *kept* loose and given plant food. Grass may benefit from the extra watering used when applying the conditioner. The latter may also have a hormone effect (some evidence here, but no certainty).

Claim: Can't hurt the plants.

Truth: Chemical conditioners are basically plastics. Use too much and you "water-proof" the soil. Then no air or water gets to the roots—and plants die. Be sure to follow manufacturer's directions on how much to apply.

Claim (made for combination conditioner-plant foods): Adds plant food.

Truth: Technically true, but how much—and at what cost? Plant food costs far less per pound than what you pay for it in the mixture. Besides, you get less of the more valuable conditioner chemical.

Claim: "X" brand results in larger soil "crumbs."

Truth: Nobody knows what size crumbs are best for root growth. There is evidence that crumbs can be too big for successful growth.

Claim: "X" brand results in crumbs of uniform size.

Truth: Nobody knows that this is desirable—uniform crumbling certainly is rare in nature.

What to look for when you buy chemical soil conditioners:

1. The active chemical primarily. All brands contain either VAMA (Krilium) or some form of polyacrylonitrile, or a mixture of both. VAMA seems to be about 30 per cent more effective on most soils, so consider this when you compare prices.

2. How much active chemical—how much filler? For powders, multiply weight of package by percentage of active chemical. For liquids, assume a gallon weighs 9 pounds (thus one gallon of a 10% solution really contains less than one pound of active chemical conditioner).

3. Should it be dust or spray? If you are making a surface application, this is a personal choice. If you are treating the soil 4 or more inches deep, then powders are much easier to use.

VAMA (Krilium) comes only as powder. Polyacrylonitrile comes as powder, liquid, or flakes that you must dissolve in water and apply as a spray.



Photos courtesy House Beautiful

This soil stayed fluffy because chemical conditioner had been mixed into it before planting.

Spraying conditioner on surface after planting kept upper inch of soil loose, allowing seedlings to emerge easily.



Hardy primrose (foreground) and tender fairy primroses (*Primula malacoides*) growing in the author's sun heated pit.

SUN-HEATED PITS VERSUS GREENHOUSES

Each has its advantages; either will provide gardening pleasure during winter months

Kathryn S. Taylor

Condensed from *Horticulture*, October, 1953

ALTHOUGH there has been a considerable increase in the number of greenhouse owners in recent years, there are still many potential winter gardeners who are unnecessarily denying themselves the truly thrilling rewards of digging in the soil when the garden outside is deep in snow.

Cost Not Sole Consideration

The conventional type of greenhouse is the dream of most flower lovers who feel that settling for any less ambitious structure would be the result of necessity rather than of choice. However, visitors to amateur greenhouses and sun-heated pits have been surprised to find that some

winter gardeners have a preference for the pit even though from the financial angle they could have had much more pretentious greenhouses if they had so desired.

Actually, the available time to spend on a winter garden is equally as important as the cost and this fact was fully appreciated by these pit owners with growing families and many outside obligations.

Some pit owners have practically turned their pits into greenhouses by putting in heaters with thermostatic control, but by so doing they have added to the amount of attention that must be given the plants because of the increased

Rolled up at the ridge of this sun-heated pit is a heavy pad which is lowered over the glass before the sun goes down.



Photos courtesy Horticulture

warmth. The main advantage of the pit should be that it produces, with a minimum of effort, a constant supply of flowering plants that can be moved into the plant window of the house for fuller enjoyment or be left in the pit to give a much longer blooming period because of the cooler environment.

It is best to understand at the outset what a sun-heated pit can be expected to produce in contrast to a greenhouse of similar size and proportions.

Sun-heated Pits

Construction. A sun-heated pit is a structure partly below ground facing due south with glass on that side only. The dirt floor is about 3 feet below ground and the excavation is lined with a wall of cement or building blocks. All parts above ground are insulated. Adequate drainage is needed in heavy soils. The glass on the south side should be at a slant of 45° to allow for maximum benefit from the sun's rays in winter. Heavy pads are drawn over the glass before the sun goes down or are left in place during cloudy weather.

As originally planned the north, shingled roof of my pit sloped at the same angle as the south side. However, a much less steep angle is recommended for the north side, especially if the pit is dug into a side hill. With this broader angle, much more head room inside is allowed for large plants of azalea, camellia and the like.

The management of the pit is so simple that it can be left to shift for itself over a week-end if necessary; no greenhouse could ever be so handled. Practically no spraying is required and the plants are watered only when absolutely necessary.

Fresh air must be admitted whenever possible. Otherwise, the air may get musty and mildew may form on susceptible plants. The pit should be ventilated at both ends on every sunny day no matter how cold the weather and also on cloudy days if the temperature is above freezing. The door and ventilator openings should be adjustable from the width of a crack to fully open. This can easily be done with hooks of different lengths. In an exposed place, a muslin screen placed over an opening would prevent too great a draught. A ventilator to draw out damp air, of the type used in kitchens, might be a helpful accessory although an intelligently handled pit should not need one.

The plants are growing under almost outdoor conditions and therefore they do not make the leggy growth seen in some amateur greenhouses.

Woody plants. There is a most interesting opportunity for experiment in hunting out suitable plant material for trial in the pit, particularly among woody genera. Two broad-leaved evergreens that flourish in the cool air are species of camellia and winter daphne (*Daphne odora*) which is intensely fragrant

Varieties of *Camellia sasanqua*, a species with rather small leaves and somewhat double or single flowers, some much like pale pink wild roses, start to flower in early fall. These are followed by the common camellias (*C. japonica*), of which it is best to use only early and mid-season varieties.

The tender species of holly with very shiny, rich, green leaves of different shapes and sizes are unusually attractive. A small specimen of holly in fruit is a splendid subject for Christmas decoration in the house. The winter gardener should scour the plant catalogs from warmer climates to find genera that normally blossom during our winter season. Two examples are pink Australian-fuchsia (*Correa pulchella*) and Geraldton wax-flower (*Chamaelaucium ciliatum*).

Among herbaceous plants the primroses take the lead. The fairy primrose (*Primula malacoides*) is especially reliable and always flowers during the winter. The plants blossom much sooner if taken into the house but the room must not be hot. The hardy primroses *Primula acanthis* and *P. polyantha* are also sure to do well. A collection limited to shades of blue and of yellow is a beautiful sight.

Winter-flowering forget-me-nots (*Myosotis sylvatica*) really flower in the winter; other favorites are violets, sweet peas (*Lathyrus odoratus*), wall-flowers (*Cheiranthus cheiri*), stocks (*Mathiola incana*) and pansies (*Viola tricolor* var. *hortensis*). All such plants must be brought nearly to the flowering stage before cold weather sets in.

Storage. One must look upon the pit as holding a bit of a mild southern winter captive within its walls. Perennials of doubtful hardiness can be lifted before freezing weather and stored in a dry corner of the pit in a flat. Pots of zephyrillies (*Zephyranthes*) and similar southern bulbs can be set on their sides beneath the bench for the winter. The pit is too cold for the storage of tropical bulbous plants such as achimenes and gloxinia which need the warmth of a greenhouse.

The average night temperature of the pit is 40°F., which provides ideal conditions for the stratification of seeds of alpines, wild flowers and various trees and shrubs.

Seeds of any annuals and vegetables wanted very early for the outside garden can be germinated in the house under a tent of polyethylene and then be transferred to the pit to be held back until the weather is warm enough to plant them outdoors.

Advantages of Heated Greenhouses

The gardener who wants a constant supply of cut flowers and who has sufficient time to spend in raising them would certainly prefer a conventional greenhouse. Attention to watering, spraying and feeding becomes increasingly important in direct proportion to the raising of the temperature at which the house is run and to the amount of sunlight available.

Plants can be more crowded in a house run at 50°F. night temperature than at 60°F. although any crowding of plants should be discouraged. By having the benches at different levels and by judicious use of shelves and hanging baskets an incredible number of potted plants can be grown in a cool greenhouse with much success.

It is interesting to find what a difference it can make to certain plants to be raised close to the glass instead of remaining on the bench; also, to see how much more quickly a potted plant set on an inverted pot dries out than one just like it set on the bench. If the amateur grows one main crop, such as snapdragons, the plants must be similarly placed with light and air on all sides.

During December and January the amount of color in the greenhouse can definitely rival that in the pit but as the sun climbs higher there will be much less difference.

Flowers suited to greenhouse culture are of too great variety to enumerate here but, just as in the pit, only those enjoying similar conditions should be grown together.

WHAT A HEDGE CAN DO FOR YOU

How to use hedges for protection, privacy, and beauty

Phil Amundson and Douglas Baylis

Reprinted from *Better Homes and Gardens*, May, 1953

NEED more privacy for outdoor living? A screen from stiff winds? Like to conceal a too-close highway or a far-away factory, or simply blot out your neighbor's garage?

You can improve your place in these ways — and a dozen more — with hedge plants. But buy and plant carefully. Since almost any woody plants can make some type of hedge, you have many forms, heights, and kinds to consider.

Select varieties that stay attractive with little attention under soil and moisture conditions provided. Place them where they'll work for you and look attractive.

Kinds to consider. Your hedge can be low, medium, or high; clipped or untrimmed and informal; dense or loose. You can have flowers, and nuts or fruit.

Plants that grow naturally in the form that meets your needs need only nipping of branch ends once a year to stay neat. Choose plants that will grow to desired height quickly, won't get too tall or wide.

You should shear a formal hedge often so it becomes full and dense. Even so, allow for expansion as it grows older.

The best hedges are those that leaf out early, hold foliage until late fall. Plants with large leaves and coarse branches

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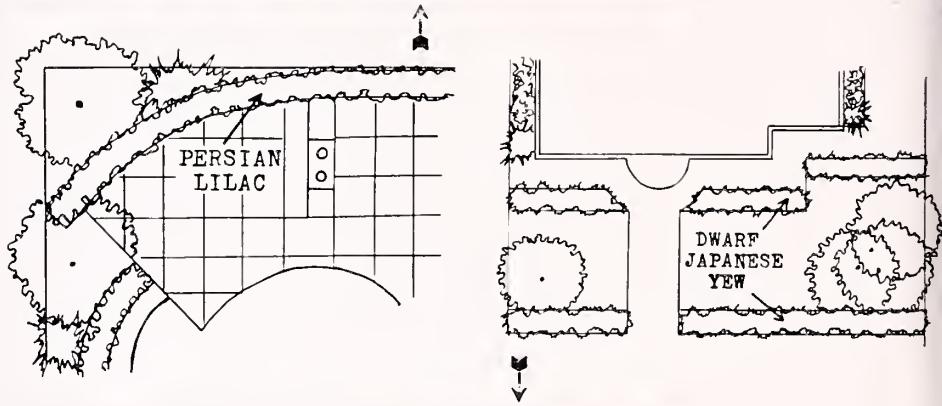
Drawings courtesy Better Homes & Gardens



Russian-olive (*Elaeagnus angustifolia*), left to grow naturally, gives a handsome background, screens out summer winds. Set plants 4 feet apart in a 15-inch-deep trench. For best results, plant 50 to 75 feet from house.



Persian lilaes (*Syringa persica*), left untrimmed, make an attractive 5- to 6-foot informal border planting for a family terrace. Space the plants 3 feet apart in soil worked 15 inches deep.

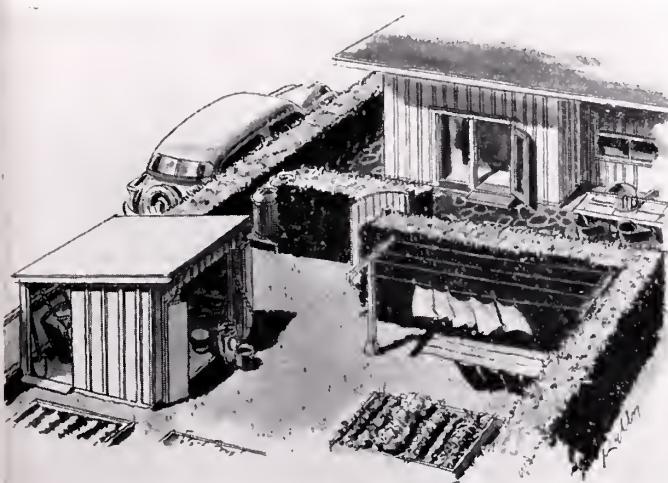
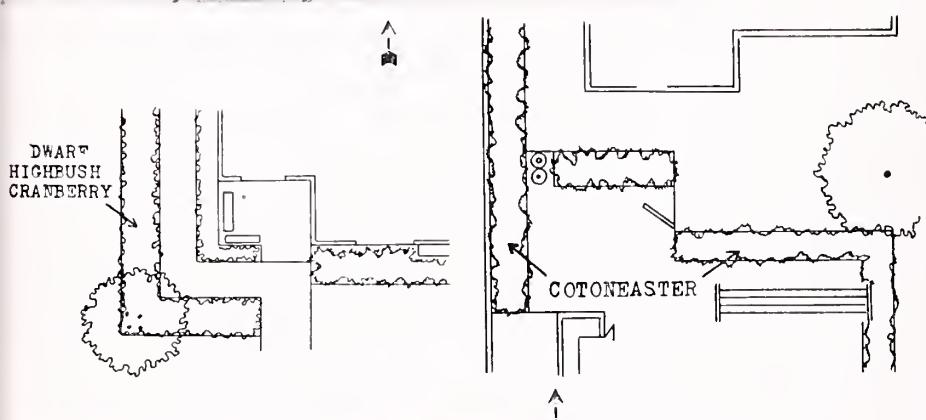


Dwarf Japanese yew varieties (such as *Taxus cuspidata nana*) stay green and compact all year with little clipping. Where it is hardy, dwarf boxwood (*Buxus sempervirens suffruticosa*) or holly (*Ilex*) is good for "balanced" house planting. Plant a foot apart in a foot-deep trench.



Dwarf highbush cranberry (*Viburnum opulus nanum*) is hardy and can be used for edging or for a hedge in heavy clay soil. Set a foot apart in a trench 8 inches deep.

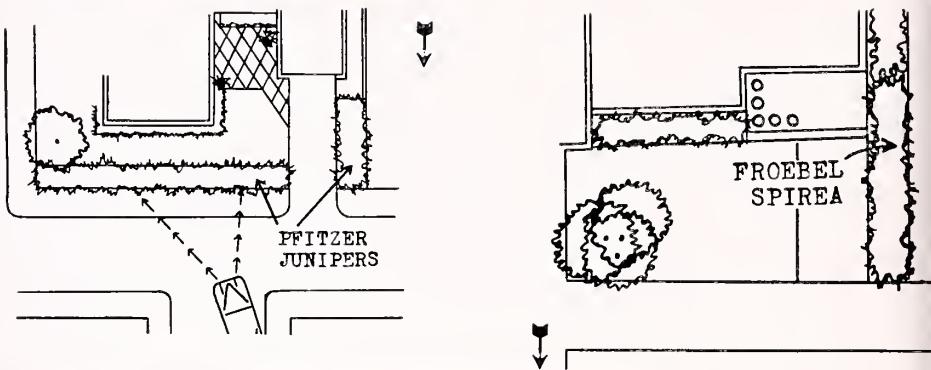
Trim as needed.



One of the hardy shiny-leaf varieties of cotoneaster will serve ideally as a living screen for privacy. Lustrous leaves and dense growth make cotoneaster very attractive in a clipped hedge. Set plants 2 feet apart in a 12-inch deep trench.



A row of close-clipped upright junipers will shut out the beams of headlights and block dust and sound. Space plants 30 inches apart in trench prepared 15 inches deep.



Where a low informal flowering hedge is wanted to make a permanent boundary, try Froebel spirea (*Spiraea bumalda froebeli*). Set plants a foot apart in a trench prepared 8 inches deep, with outer edge next to boundary line.

For a neat, dense, low-growing evergreen border, try germander (*Teucrium*); set the plants 4 to 6 inches apart in full sun. A good deciduous substitute for edging is dwarf alpine currant (*Ribes alpinum pumilum*), which bears red berries in the autumn.



adapt best in background or informal hedges. Use shrubs with smaller leaves and fine branches for edgings.

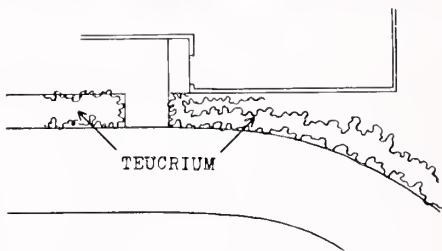
If part of hedge will be shaded, select a variety that grows in shade. But expect growth in shade to be different from that in sun.

Preparing soil. You'll need deep, rich soil for good growth, neat appearance. If soil is unsuitable, replace top 18 to 24 inches with good topsoil. If soil is heavy, sandy, or not fertile, mix with a liberal amount of peatmoss or compost for good results.

When plants arrive, open package and separate them. If you can't plant at once, lean them in a shallow trench and cover roots with moist soil. Take plants from trench a few at a time. Keep in water or covered with wet burlap until you are ready to plant them.

Spacing. Space dwarf edging plants about 6 inches apart, plants in medium-height hedges a foot apart. Set large shrubs and trees for high, clipped hedges 18 to 20 inches apart. Allow 6 to 8 feet between large trees in use as tall screen.

Shrubs for untrimmed hedges should be spaced two to three times as far apart as the same varieties in clipped hedges.



Hedges grow wider as they grow taller. A clipped hedge 3 to 5 feet high will be 3 to 4 feet wide. It should be set 18 to 24 inches from wall, drive, or property line. A spruce screen 20 feet high needs about 7 feet on either side of row, and a low edging needs 3 to 6 inches.

Pruning and shearing. Encourage low branching—cut back shoots of trimmed hedge during first winter so only a few inches of new growth remain. Pinch or clip tips once or twice during next growing season to cause side branching.

If you want a low- to medium-height informal evergreen hedge, select plants with low branches. Just cut back branches an inch or so after planting to make bushy.

For a formal evergreen hedge, shear or pinch back new growth during growing season. Pinch back emerging pine "candles" before new needles start. Then leave alone.

Trimming and Planting a Hedge



By using movable stakes and a line level for a guide, the top lines of a clipped hedge can be kept perfectly straight and unscalloped.

Once the lower branches are established, one or two light trimmings per year will keep the bases of most hedges filled out densely to their full width.



Good hedges have broad bases, with both sides sloping outward from top to bottom of the hedge. This prevents top growth from shading bottom leaves, which otherwise die and fall off. The taper also helps to shed heavy snows.

Don't trim without guide lines. Stakes equipped with a screw eye through which a cord has been threaded will help keep lines of the clipped hedge straight and at proper taper.



Shear often enough to keep the hedge neat. Use sharp shears.

If there is a considerable amount of hedge that requires clipping, an electric hedge trimmer will save time and labor. Try the trimmer before buying it. Keep hands away from the moving blade; and store trimmer out of children's reach. Do not use a hedge trimmer for any job it is not meant to do.

Don't ever try to prune trees with it.

Photos courtesy Better Homes & Gardens



Large, widely spaced plants for screening are best planted individually. Plant others in a trench. A trench 12 to 18 inches deep and wide easily handles roots of most hedge plants.

Trim any broken roots. Hold the plant upright while spreading out the roots. Work soil through them. Set plants at same depth as they were growing before.

When all plants have been set and the trench is half full of soil, fill it with water to the top. Let water soak in thoroughly, straighten up plants, and fill rest of trench with remaining soil.

Cut back the tops of hedge plants other than evergreens to about 6 inches above ground, and cut to about 18 inches for bigger plants.





Gottsch

A fine picture window in a living-room corner of a country home. The fortunate owner found it unnecessary to do special planting.

PUT A PICTURE IN YOUR PICTURE WINDOW

*If your picture window boasts more window than picture,
there's a remedy*

Donald J. Bushey

Reprinted from *Flower Grower*, March, 1953

If your home is in the country and your picture window frames a distant view, you really have a PICTURE window. Little planting is needed nearby, except perhaps a small-growing deciduous tree for summer shade and a low hedge, shrubbery or flower border beneath the window. (See Figure 1.) But if you live in a fully built-up community with houses all around, yours is likely to be a picture WINDOW . . . that is, it's apt to boast more window

than picture, providing the public with a clear look into the house and/or framing an unwanted view. Most people will agree that a neighbor's driveway, garage or clothes-drying yard is not an attractive sight. So if you daily stare such a view in the face, why not get busy right now and change it. Plant your own picture right on your own property . . . with an eye, too, to escaping the public eye if that's a problem.

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A picture had
to be created for
this window.



Gottsch

Planting for Front and Side Windows

Because most picture windows are located at the front or side of the house, let's consider planting methods for these windows first. If the house is on relatively level land, the distance from house to objectionable view governs, generally speaking, the type and size of screen to use. But, in most instances, a 6-foot-high screen planted along the property line should suffice provided this line is 10 to 25 feet from the house. The screen can be either a sturdy vine-covered fence or a clipped hedge. If the fence is your choice,

big-leaf wintercreeper (*Euonymus fortunei vegetus*) is a good evergreen vine to use, providing a year-round screen. If eliminating the winter view is not necessary, a dense deciduous vine, such as clematis, American bittersweet (*Celastrus scandens*), trumpet honeysuckle (*Lonicera sempervirens*), five-leaf akebia (*Akebia quinata*) or climbing roses will do nicely. In either case, the living green wall is an excellent summertime foil for a bright flower border. (Figure 2.)

If a clipped hedge is the preferred property line planting, suitable evergreens are upright Japanese yew (*Taxus cuspidata capitata*), hemlock (*Tsuga canadensis*).

(sis) and American arborvitae (*Thuja occidentalis*). If only partial screening in winter is required, a deciduous hedge such as Amur privet (*Ligustrum amurense*), Chinese lilac (*Syringa chinensis*) or Tatarian honeysuckle (*Lonicera tatarica*) is sufficient. This type of planting is often placed along roadsides to screen the view both ways.

If the house with a front or side picture window is several feet above street level, seclusion is obtained more easily. In such situations the front lawn is generally graded level from the house for 15 feet or so with the balance more steeply sloping. To provide complete privacy from the street and yet not obstruct the distant view, plant a 2- to 2½-foot hedge at the edge of the level section.

Plantings Near Windows

Regardless of which side of the house the picture window is on, there's one type of treatment—namely an open, lacy, foliage effect close by the window—which contributes privacy and a pretty pattern of a picture. A small, carefully pruned dogwood tree placed directly opposite one side of the window and 6 to 8 feet from it is one type of planting which will achieve this effect. A vine planting is another. Place a widely spaced wire framework over all or just a portion of the picture window, 1 to 1½ feet out from it, and train a deciduous vine, such as clematis, to grow into an intriguing pattern on the wire. Only a light tracing of foliage is necessary. When the vine is in flower, the view from the room will be an attractive floral picture. In both instances, the view from the outside in is screened much more effectively than the view from the inside out.

For New Homes

If you are building a new home with one or more picture windows, plan carefully where they will go. The location and character of the building site should dictate their placement. If your house is to be in a built-up area and near to and at about the same level as the street, bet-

ter think twice before placing a picture window in a front wall. But then, of course, there are always differences of opinion as to what constitutes a good view. Some folks like a street or road view. But even if this is the case, there's still another factor to be considered. Remember that passers-by will have the same opportunity to see you and the contents of your living room as you have to see them. This view opportunity is most nearly equal when the house is close to the street and on the same level. If the house is below street level, passers-by have the edge! In the latter case, small high windows on the front wall are the best answer.

The nearness of your neighbor's house governs the advisability of placing a large window in a side wall. A nearby structure cuts off the distant view and decreases privacy. And even though there's a vacant lot or open country to the side now, you have no assurance that someday a home won't be built there. It's wise to plan as though a house were located there now.

The rear wall of the house is probably the safest place for a picture window in built-up areas. Usually there's ample space in the back lawn to plant a picture and screen the public's view into the house.

Country Sites

If your house site is in the country and a considerable distance from and above the highway or road, a large window may go on any side—ideally the one offering the most interesting view. If the best picture happens to be at the front, a big window there admits a view without exposing the interior to the public eye. The view advantage increases proportionately with the distance of the house from the road and the height of the house above it.

Whether you're working with picture windows you already have or with those you plan to have, give as much thought to the pictures you will see through them as you do to the paintings you hang on your walls, for they can afford you equally rich and soul-satisfying enjoyment.

TRANSPLANTING EVERGREENS

A word and picture story

P. J. Van Melle

Reprinted from *The Home Garden*, September, 1953

WHILE in the early fall trees are not as "hard" as in the early spring and must, therefore, be handled with greater care, fall planting offers, nevertheless, an important advantage. The fall is a season of vigorous root development that continues well into winter. This seasonal urge speeds the re-establishment of the transplanted root system, so that it may support a near-normal top growth the following spring.

While spring is the one safe season for both wild and cultivated things, the latter may be safely moved also from early September to late October; that is, during comparatively cool and moist weather. If you cannot avoid transplanting in dry weather, soak the soil to a depth of at least a foot a day or two before.

Digging the New Hole

Plant in good soil. If, as in most cases, your topsoil is scant, and the sub-soil poor, you had better purchase a load of good topsoil. If the excavated soil is capable of being conditioned, add to it humus, or, better, half-decayed leaves, plus a little dehydrated cow manure, up to one-fourth of its volume.

Dig the right hole. To plant a ball up to 15 inches wide, dig a hole 15 to 18 inches wider. For a ball 18 inches wide or more, allow 12 inches around it. For a ball 12 inches wide, dig 12 inches deep; for an 18-inch ball, about 17 inches; for

a 30-inch ball, about 22 inches. These depths are to be adjusted later.

On a ring of burlaps (to keep walks or lawn neat and clean) place separately the sod skimmed off the surface, the soil immediately below it, and, if it is to be conditioned, also the subsoil.

Handling the Tree

Mark its best side with a flag, so that it will face that way when re-set.

Tie in the lower branches tightly, not with string, but with strips torn from a cotton feed bag, tied end to end. Tie one end to an inner stem and wind the bandage once or twice around the lower branches, spirally upward. Rake away from the tree any deposit of fallen needles or foliage. Spread burlaps around area.

Mark out the trench. Draw a circle about the butt of the tree, with a radius 3 to 5 inches over that of the estimated ultimate ball size; and another, 12 inches farther out. The area between the circles marks the trench, which is to be dug, straight down, to a depth just below that of the main mass of fibrous roots. All roots encountered are cut away.

Mark the size of the ball. Draw another circle, 3 to 5 inches inside the first. With a short-handled fork gently pare down the inner wall of the trench to this size. Cut off cleanly all stiff, inflexible roots that come into view, but save all



Trimming the top before tying.



Combing the root ball with fork.

the thin fibers. Round off the shoulders of the ball.

Under-cut the ball, at a depth just below the main mass of fibrous roots, by jabbing inward, as horizontally as possible, with a sharp spade, until the ball rests upon a small pedestal. Scoop out all the soil dislodged in this process.

Wrapping the Ball

One man can lift a ball up to 15 inches wide off its pivot onto an opened bag spread beside the hole. For a tight wrap, twist the corners of the bag and tie them, across the top of the ball, to their diagonal opposites. One man may then lift the ball onto a wheelbarrow.

A ball 18 to 20 inches wide requires two men. The under-cut tree is heeled over from its pedestal. Any stiff roots remaining in it are cut off clean, the ball smoothed off. A light burlap or cotton feed bag is rolled up partly and placed upon the floor of the hole, with the roll nearest the ball. The tree is then heeled in an opposite direction, the roll pulled out, and the tree stood up straight. Two men, taking hold of the burlap, can lift the tree out of the hole.

A ball over 22 inches wide should be handled differently. Having been undercut, its sides are wrapped in two or more (preferably cotton) bags before the bottom burlap is placed. To two cor-



Old sods floor new hole.



Tree is carried in burlap cradle.



Lifting ball onto burlap.



Simple cross-tie for small ball.

ners of each side-wrap long, strong drawstrings are fastened. The wraps are draped about the ball, with the string side down, and drawn underneath the ball to the very pivot. The drawstrings are led underneath the ball and up, across the top, toward the diagonally opposite corners of the wrap, which are twisted up, and to which the strings are drawn up very tightly and fastened.

The tree is then heeled over, and the bottom smoothed. The bottom burlap is then rolled and placed, as just described, though its corners will not reach across the top of the larger ball. Therefore, drawstrings are attached to two corners of the bag, and loops to the diagonally

opposite corners. The strings are led across the top of the ball, then through the loops, and drawn up very tightly. The tree now stands upright in the hole.

Lifting a Heavy Ball

Without power equipment to raise as heavy a tree as the 7-foot Hicks yew shown in the photographs on pages 262 and 263, we must make it lift itself.

Heel the tree over on its side. Where it stood, shovel in about 6 inches of the excavated soil. Lay the tree over in the opposite direction, and repeat the fill, and so on.

The next problem, transporting to plant hole, is detailed in the last two pictures on page 263.

Use water as a fill-up tool.



Mulched for new lifelease.

Photos by Kinney, courtesy The Home Garden





All clear but the "pedestal."



Beginning the big-ball wrap.



Planting the Tree

Measure the depth of the ball. Then place a stick or 2 x 4 across the hole and measure its depth. The tree must be set at the depth at which it stood. The floor of the hole is to be raised sufficiently to ensure this by shoveling in the prepared planting soil. If a 3-inch fill is indicated, add another inch to allow for settling.

A large ball must be brought to the rim of the hole on planks that project over it. As it is eased over the rim the planks tilt downward and the ball slides into place. Very solid small balls may be lifted off their untied burlap and placed in the hole. When a large ball has been placed, the drawstrings are

loosened. The bottom bag is spread out flat; the side wraps are pulled out, or cut away.

Stand the tree erect. If it leans, build topsoil under the low side.

Fill the trench carefully. Fill in a few inches. Kick the soil with the toe, inward, under the ball, carefully lifting up the roots. Then fill in a few inches at a time, combing out the exposed roots and laying them out horizontally.

For small balls, fill the hole up in this manner two-thirds of the way. Then soak the filled-in soil thoroughly and let it settle. After a while, fill the remainder of the trench in the same manner, flush with the grade.

Wrapped, but still in the hole.



Filling up hole has lifted ball.





Side wrapping is repeated.



Ready for the bottom sling.

For larger balls, fill up the trench in the same manner, half-way. Then soak the soil to fluidity. With a crowbar, poke underneath the ball, from the outside in, swaying the bar sideways. This will let the mud into air-pockets, if any. Let the mud settle. Then fill the rest of the trench in the same way, level with the grade, and water the upper fill.

Apply a mulch. After the soil has settled, place a mulch of half-gone leaves or other, non-heating mulch material, neatly about the base of the plant, taking care that no branches are buried.

Untie the strips with which the lower branches were tied in, and ease these branches into their natural position.

Subsequent Watering

Except small plants, with balls to 12 inches wide, trees planted and mulched in the manner described during September or October should not require watering at the base for a month. But in dry weather a mist-spray (from a hose-nozzle so placed as to cover the tree and its immediate environment), applied in the evening, will be helpful. Do this, in dry weather, twice a week during the first two weeks; in extremely dry and sunny weather, every evening. Small plants may need watering at the base in dry weather as soon as two weeks after planting.

Tilted to receive the platform.



Ready to be rolled away.

Photos by Kinney, courtesy The Home Garden





The Valley of Champex as seen from Flore-Alpe.

MY MOUNTAIN GARDEN IN SWITZERLAND

I call it Flore-Alpe

J. M. Aubert

DURING a September week-end many years ago I had attempted the ascent of a satellite peak on the Swiss slope of Mont Blanc. The weather had been terrible. It rained at the lower altitudes and snowed higher up. We were in the clouds, so fog was everywhere. All the sworn enemies of alpine climbing seemed to have plotted against any ascent of the final peak. My guide and I had been compelled to find shelter in a hut at about 10,000 feet. From these difficult circumstances, as for many things in a man's life, arose the dream of Flore-Alpe.

We began our descent of the mountain over snow-covered and slippery rocks. From the barrenness of higher altitudes we reached the wooded area commanding the vale of Champex. Soft light spreading over this small mountain valley gave promise of better weather. Eventually the sun appeared after two days' hiding, and when at last Lake Champex was in sight, it was bathed in light and looked like a huge diamond set in a crown of emerald-green forests and meadows. The group of the Grand Combin (13,000 feet), with its mass of white snow, commanded the whole scene.

Origin of Flore-Alpe

Facing this splendid sight, I reflected that this was the very place where I should like to own a mountain home. A few years went by, and this dream was realized. A modest dwelling was acquired and a garden with alpine plants. It was rather small at the beginning, but contained alpine species of rock-jasmine (*Androsace*), anemone, pink (*Dianthus*), gentian, lily, and primrose (*Primula*). Several species of saxifrage were added later on. The garden was gradually extended to its present area of about four acres. Plants of all the mountainous regions of the five continents are now to be found there.

Vale of Champex

The vale of Champex is a high valley at the northern end of the Mt. Blane group, only a few miles from Grand St. Bernard Pass of world fame. The average altitude is 4500 feet. It looks like a park of forests, meadows, and sheets of water, with brooks winding their

courses around rocks and in fir woods. It has true alpine charm; it is a place about which one dreams for a summer holiday.

The alpine character of the valley is strongly emphasized by the nearness of glaciers. It is the last inhabited level of the mountain; above it lie the austere slopes of the high summits and the complete solitude of the glaciers. On greyish days one hears, over the vale, the dialogue of winds blowing on the ridges and murmuring below in the valley.

The fundamental conditions necessary for an alpine garden are present here; the soil is true glacial moraine; the surrounding forests offer protection from the winds and temper the cold and heat. From autumn to late spring the region is under snow.

In the Garden

As soon as the visitor leaves the road rising from Champex to enter my garden, Flore-Alpe, he finds himself in the midst of rocks and flowers. The floral settings imitating nature in the mountains give

Sky and trees are reflected in one of the numerous placid pools.

Photos author courtesy





Steep wooded slopes and distant snowy peaks lend grandeur to the surroundings.

a sense of joy, happiness, and youthfulness.

Paths and lanes lead through the garden past numerous pools—lovely miniature lakes bearing fanciful names. Each has its own distinct character. A rivulet winding through the grass connects the pools, its easades filling the air with silvery sounds. Small hills, diminutive replicas of some of the surrounding peaks, dominate the garden.

From certain vantage points, Lake Champex can be seen far below, glittering in the sun among green forests, mirroring the giant Grand Combin.

In the nursery thousands of seeds are

sown every year and plants of all kinds are grown from them under the expert care of a head gardener and his staff. These are transplanted at the proper times to embellish the garden scenery. One of the "hills" is reserved for growing plants of especially delicate nature. It has both north and south exposures, which permits the most varied culture.

Symbolism of Flore-Alpe

A garden must first of all appeal to the eyes, but it may also have profound meaning. The Japanese, who (after the Chinese and the Koreans) are masters in creating and shaping gardens to follow nature, introduce arrangements of flowers, rocks, and water with symbolic meanings, for they intend to satisfy the heart as well as the mind.

So it is for me with Flore-Alpe.

This garden is first of all an interpretation and a reproduction of the mountain scenery with its summits and its water courses, on a reduced scale, as natural as possible.

With but little imagination, a walk through Flore-Alpe might be taken to represent the span of life. Youth, full of hopes and ambitions, the prime of life with successes and honors, and old age, characterized by regrets and weakened activity, are all represented. Even family life, with the happiness it brings, is symbolized by the nursery. All along the path are intermingling rockeries and flower patches that to me represent the cares, difficulties, and sorrows as well as the charms of life—joy, pleasure, success.



Alpine plants from mountain regions all over the world bloom among the rocks of Flore-Alpe.

Photos author courtesy

PLANTS FOR DECORATING BLANK WALLS

Unrelieved walls of modern architecture are given new interest by specially trained trees and shrubs

Fred J. Nisbet

Condensed from *American Nurseryman*, January 15, 1953

CURRENT changes in architecture have demanded a change and an expansion of our use of plants. An important phase of the problem is the planting of the large, blank walls which are becoming increasingly prevalent in modern domestic architecture. It is now a common architectural practice to have large areas, sometimes whole sides of a building, essentially blank. In some cases there are many small windows, all located near the top of the wall, in a clerestory type of arrangement. Many of these walls are made of a single material and, having no variations in line, are likely to be monotonous. It is here that we may well use many plants in a peculiar way.

Espalier Trees

In the past, gardeners have often used plants grown flat against a wall. In Europe, particularly, such espalier plants, as they are called, have long been employed. Efforts have been made to import this fashion into this country at various times in the past, and at present there are several sources of such material. At no time, however, have the efforts in this direction influenced any large proportion of the American public. The reasons for this failure may well be several. In almost all cases this material was restrained

into specific and stylized patterns. In addition, most of it was grafted on dwarfing stock. These severely restricted plants demand a great deal of maintenance, and a good knowledge of pruning principles is necessary to keep the plants within the prescribed size and shape. Last of all, the broad American tradition seems to rebel against such severe formality.

Recent Interest in Wall Plants

With the advent of many blank walls in modern housing, we can now find the beginnings of a considerable interest in wall shrubs. The current use differs from the usual European practice in using plants quite informal in growth and of a normal size.

The methods of supporting the plants vary. In a few cases light trellises may be employed. Generally, however, the plants are either fastened directly to the wall or tied to a grid of wires which are fastened to nails in the wall. Aluminum nails are well adapted for use in wooden walls, while lead anchors or wooden plugs are generally used for masonry. Iron nails with lead straps on the head are useful when the plant is not excessively heavy. Special ceramic plugs with flexible copper straps in the head for holding branches are also available. These



McFarland

Firethorn (*Pyracantha*) trained against this wall makes an interesting pattern.

may be cemented to any type of masonry surface where drilling for anchors is not desired.

Shapes and sizes. There can be no one definite statement as to the shape these plants should have. Varying shapes, sizes and materials in the walls, the effects desired and the plants used would all have a bearing. As a general rule, it is wise not to cover the wall completely. Rather, the plant should be trained in an interesting pattern which would expose portions of the supporting wall, thus giving interesting contrasts of texture and color. A fan shape is probably simplest to achieve, but an infinite variety of forms may be devised. After the desired shape is fully formed, heavy pruning may be employed to hold the plant in bounds.

Which Plants to Use

A major question in such a discussion is, what plants lend themselves to such use? An amazing number fit the needs of the method well.

Among the easiest plants to train are scarlet firethorn (*Pyracantha coccinea lalandii*), *Forsythia suspensa*, winter jasmine (*Jasminum nudiflorum*) and common flowering quince (*Chaenomeles lagenaria*). In the last-named be certain to select those named clones with good clear colors. Other species in these genera are also useful.

Among the trees, several magnolias make fine wall plants. Sweet bay (*M. virginiana*), *M. kobus borealis*, star magnolia (*M. stellata*) and saucer magnolia (*M. soulangeana*) are particularly useful.

The handsome deep green foliage of magnolia relieves the monotony of a corner in this blank wall.



McFarland

The tea crab (*Malus hupehensis*) is exceptionally fine because of the long, wandlike branches, the vase-shaped habit and small size. Most other crabs of good horticultural qualities may be used.

Yew (*Taxus cuspidata*, *T. media* and its varieties) is good, also, particularly where a relatively slow-growing evergreen is desired. Glossy-leaved abelia (*Abelia grandiflora*), among the broad-leaved evergreens, handles easily and produces attractive effects. Viburnums in variety, especially doublefile viburnum (*V. tomentosum* and its variety *V. tomentosum mariesii*), Koreanspice viburnum (*V. carlesii*) and *V. burkwoodi* do well. The contrast between the rugose foliage of *V. tomentosum* and brick or soft gray stone is a pleasing study in variety of texture and color.

Many of the honeysuckles may be used

on walls, although some of them would require severe pruning to keep them in reasonable bounds. Winter honeysuckle (*Lonicera fragrantissima*) would probably be more desirable than most. The cotoneasters, particularly rock cotoneaster (*C. horizontalis*), would be easier to keep under control.

Not Difficult

Production of wall plants should not pose any difficult problems. Ordinary young stocks may be utilized with no advance preparation, but this would necessitate waiting some time for the desired effects. Considerable time can be saved if initial training is begun in the nursery.

Wall plants adapted to traditional American informal patterns fill a definite need in planting the modern American home.

THE IMPORTANCE OF MICROCLIMATIC PROBLEMS IN GARDEN DESIGN

Climates of specific small areas should be given consideration when planning a house and garden

R. B. Deering

Condensed from *National Horticultural Magazine*, October, 1953

To design a garden for maximum comfort throughout the year, it is first essential to have a broad understanding of the relationship of human physiology to the environmental conditions of temperature, wind, and humidity. It is necessary to know the major climatic zones and the important variables occurring within them. A careful analysis of orientation, sun positions, topography, and site factors is also required. Finally, one must have the knowledge and ability to make the best possible use of plant and architectural materials as well as other devices to improve the comfort conditions of home and garden.

Conditions for comfort. The primary objective in trying to control the climate in a small area is to produce a more comfortable atmosphere in which a family can live.

A general understanding of the processes of heat loss from the body is necessary as a starting point for improving the climatic conditions of a specific environment.

During the periods of warm weather, in order to remain comfortable, the body must lose heat through sweating. In cool or cold weather the retention of body heat is necessary in order to keep warm.

Comfort is not a constant factor among

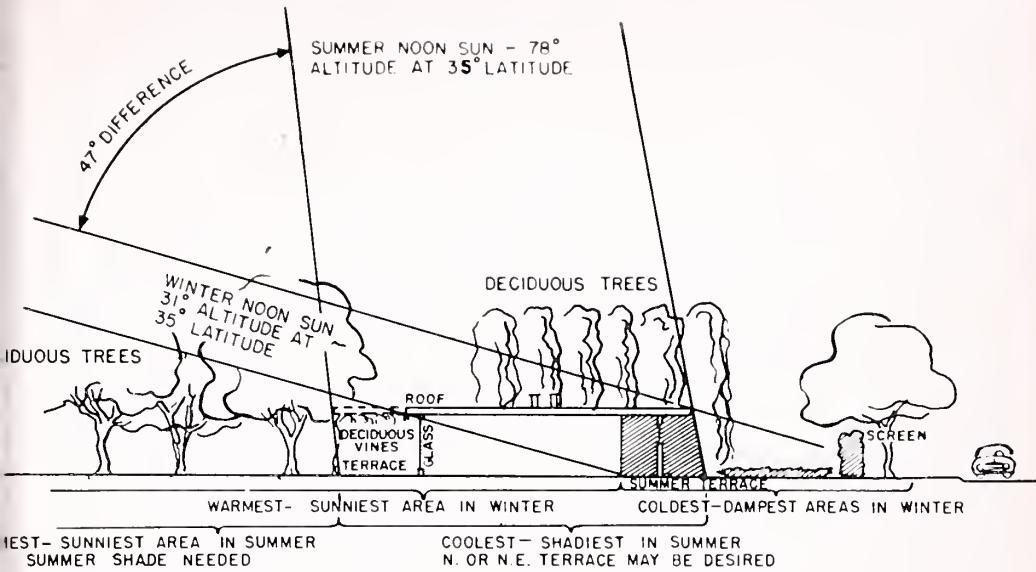
individuals, but may vary widely between people of different age groups, health, activity, and adaptation.

Some will feel comfortable at lower temperatures, others at higher temperatures. An increase in the velocity of air movement permits comfort at a higher temperature because the convective and evaporative heat loss from the body will be increased for a given temperature difference. A decrease in the velocity of air movement permits comfort at a lower temperature because the convective and evaporative heat loss is decreased for the given temperature differences.

The above two examples show the importance of the relationship of air movement to body comfort.

Seldom does one consider the climate in selecting a site; yet, if considerable forethought were given to this factor, outdoor living conditions could be greatly improved.

Topography has an important influence on the local climate because of exposure and the fact that cold air flows downhill at night. Sites exposed to the winter winds and valley bottom sites are usually less desirable because of the extra coldness at night. Frost will occur at lower elevations first, and fog is most frequent



R. D.

Author drawings

Proper orientation and planning produce warmer livable areas in winter and cool ones in summer. Cool living areas may be desired in both summer and winter in extremely hot regions.

in the lowest points. In summer the bottom land may be the warmest because it may be cut off from cooling breezes.

The best location is probably part way up a slope, but the site at the top of the hill may be desirable in warm areas. The lee side of the hill, well below the crest, is out of the area where the winds are strongest and usually will be much more comfortable.

South or southeast exposures on slopes generally make the most desirable sites. The south-facing site offers the best possibility for taking advantage of the winter sun's natural heating qualities. In climates where cool living areas are desired in winter as well as in summer, it may be more desirable to have a north or northeast exposure.

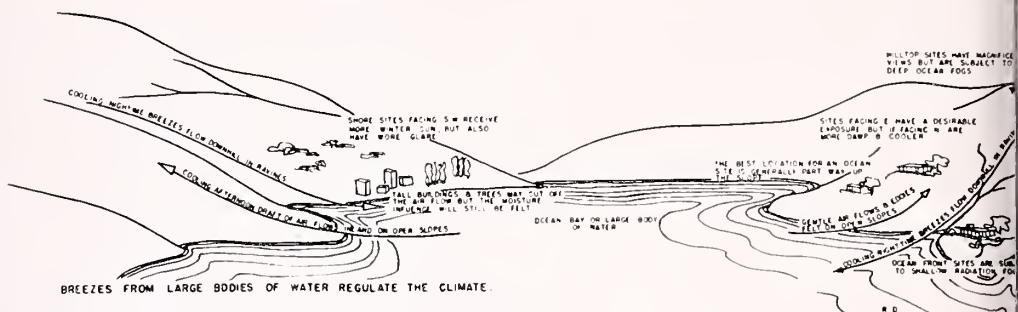
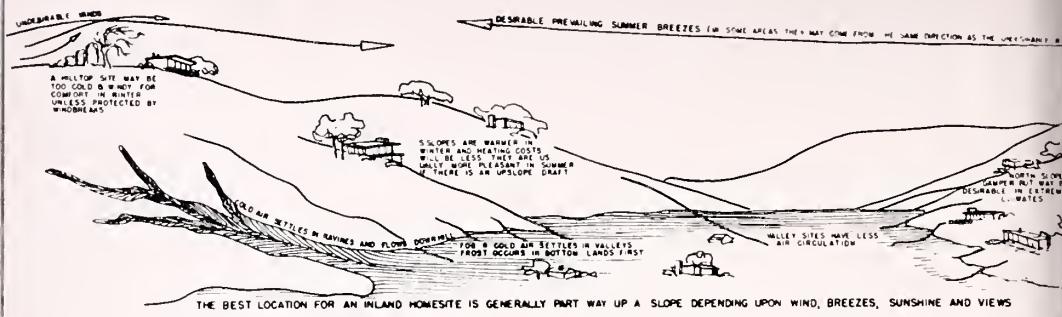
Soil and plant cover. Soil conditions and the natural plant cover generally have a great effect on the total climate of the site. Soils of different textures,

and composition have varying effects. Moist soils have lower temperatures than do dry sandy or gravel soils.

Influence of water. The winter climate near bodies of water is always more mild than in other areas. They raise the winter temperature, lower the summer temperature, and always raise the humidity.

Wind control. It is known that wind flows nearly the same as water and therefore should be handled in much the same manner. Wind can be very troublesome in open country and along coastal regions. This can be partially overcome by the proper design and use of hedges, screens, and windbreaks. Hedges and other plant materials may be more effective against the wind than a wall or fence, since the foliage tends to diffuse the wind rather than to push it over the top.

Lawns, shrubs, and trees are all effective in controlling the heat in the garden and house.



Topography and location of bodies of water are important factors in determining desirable home sites. These diagrams show some of the climatic effects of hills, winds, and water.

Sun control. It is important to understand how the control of the sun can affect living conditions and the effect of plant materials on the atmosphere.

It is known that east or west walls may receive twice as much heat in summer as in winter. Plant materials in conjunction with sufficient roof overhang can produce effective control.

Houses located in cool climates are more comfortable in winter if their living sides face toward the south. Terraces and outdoor living areas on the north or east side are usually cooler in summer.

Deciduous trees and vines can be used to cover walls, on trellises over windows, terraces, and porches, and to produce cool summer living areas. Because of the fall foliage drop they allow absorption and

re-radiation of the winter sun's heat from paving materials when it is most desired.

Plants, in addition to their shading effect, absorb and re-radiate far less heat than inorganic materials, such as walks, drives, terraces, walls, and buildings.

The number, location, size, and density of the surrounding buildings, the amount of paved area together with the total number of trees, shrubs, vines, and grass areas, and how they are used, all have a significant effect upon the climate of the site.

It is evident that many factors should affect any ultimate garden design and that the climatic factors should receive very serious consideration by home owners and communities in most sections of the United States.

STONE AGE PLANTS IN THE ATOM AGE

Every major crop and most of the minor ones are actually prehistoric. Great treasures may still lie hidden in the plant kingdom

Wheeler McMillen

Condensed from *The Land*, Autumn, 1953

IN our zeal to conserve the soil and protect the waters we incline to overlook a distinctly obvious fact. No one can eat soil as a steady diet. No one can wear it. Neither can anyone survive for long with water as the sole nourishment, even though he mix in a proportion of soil to improve its body.

Soil and moisture do provide, along with atmosphere and sunlight, an irreplaceable combination for the production of plants. We seek to conserve the top-soil of the earth and to increase its fertility in order that men may continue to harvest plants. We can eat the plants, or wear them, or make them into a multitude of useful commodities. We value the soil for what it grows, not for its relatively barren self.

These are incontestable platitudes, but they need to be restated. I confess—indeed, I proclaim—my unflagging astonishment at a particular blank area in human progress—our ignorance of plants.

Civilization progresses like an army in conflict—not along one broad and even front, but by advancing on one salient, while another stands still and awaits a suitable time to move forward. Most of us live today in a state of ever-renewed amazement at the advances we are witnessing during our short share of this twentieth century. We have seen the

movies appear on the screen, and begin to talk, and bloom in color and now advance in three dimensions. We heard radio ride the atmospheric waves and now we see the unbelievable miracle of television. Some of us are alive today only because science reached into the soil and trained antibiotic substances to protect our health. We have watched as men ride the air over land and sea and go faster than the speed of sound. We have seen the power of the atom unleashed to commit incredible destruction and now await its power to be harnessed to create wealth and happiness instead of death.

All these things and many more have we seen on earth and in the sky, on the highways and in our homes. We deal daily with miracles so profound that few of us could fully understand them all, though we gave over our whole lives to exploring their marvels and mysteries.

But when it comes to *plants* where do we stand? What crops grow in the fields of this, the most advanced agricultural country in the world? Now in 1953, at the threshold of the atomic age, what species of plants do we plant and harvest? The species of the Stone Age!

Every major crop, and most of the minor ones are actually prehistoric. In this salient we have not moved. Where in

the written records of humankind can we find the authentic story of the man who discovered wheat and adapted it to cultivation? Who brought rice into agriculture, or barley or rye or millet? What figure of record contributed corn to agriculture? Who found that potatoes were good to eat, or that apples and oranges and cherries and grapes were edible? What history reports the first use of cotton or flax for clothing?

Somewhere, far back in the dim vista of the centuries, so far remote in the mists of antiquity that no knowledge of the events will ever be resurrected, **prehistoric savages**—men with no glimpse of the future nor any interest beyond their immediate needs—discovered that they could raise crops. They chose for their crops the plant species which they could cultivate and harvest with their hands and claws and perhaps a few primitive tools.

Farmers today raise those same crops. They may drive tractors with fuel from ancient sunshine pumped up from the bowels of earth, and push buttons that cause the lightning to help their work, and kill their bugs with sprays from airplanes; they may apply genetics and a score of sciences to production; but they cultivate on hundreds of millions of acres the crops that had been selected from Creation's primeval wilderness and had become ancient long before Noah rode the Ark or the earliest Pharaoh cracked the whip over the Nile.

Those prehistoric agronomists must be admired for their wisdom, or their good luck, in selecting species of plants which have served the purposes of humankind through so many centuries. It does seem more than a little curious, however, that when modern man has found it possible to develop such magnificent tools and such extraordinary production methods, he has never seriously looked to see what he might produce if he went back to the wilderness and examined the plants that are still there. It is more than a little remarkable that when he has been able to find more than 200 uses for corn and more than 200 uses for soybeans, he has

not found even one use for most of the nearly 300,000 species of plants which botanists have identified!

This is all the more strange when scientific men have had sufficient curiosity to classify the orders and species of plants, and to lay away specimens by the millions in their dry botanical collections; it is remarkable that they should have been content to stop at this point, while manifesting little intelligent curiosity as to whether more of these species thus named and classified might conceivably be cultivated to the service of mankind.

One child might hold in his two hands a complete collection of the seeds of all the plants that man has so far found it economic to cultivate. A man might pinch between two fingers at once one seed of each of the kinds of the plants which occupy most of the cultivated areas of the entire earth. Probably no more than 1500 species are cultivated at all, perhaps fewer; only a few dozens are major crops anywhere.

Is this because modern man has subjected the wilderness plants to his keen tools of scientific inquiry and found them useless? It is not. He just has not looked.

Every plant is made up of chemical compounds which nature has arranged. These compounds are usually produced by soil and water, sunshine and air, much more cheaply than any chemist can duplicate them in the laboratory. They are potential raw materials for industrial development and human consumption whenever uses for them are found.

In the course of his experiments, the chemist has produced and observed thousands upon thousands of compounds. Most of them are, so far as he yet knows, completely useless. Their composition is noted in his records. But when he is presented with a problem he goes to his records to discover which of these previously valueless compounds may point to the answer he seeks. He takes these down from the shelf and one by one tries their effects. By just such methods more than one of our great modern medicines, insecticides and fungicides have been discovered.

No such catalogs yet exist of the characteristics of the compounds which nature manufactures in plants. The analyses have not been made.

Just a few years ago when cortisone was first produced from ox bile by a costly process requiring thirty-seven different and expensive chemical steps, it became known that kinds of *Strophanthus*, a West African vine, contained the steroids from which cortisone might be made. But not enough knowledge of the vine existed. No one could be sure whether the roots, the bark, the leaves, the flowers or the fruit should be harvested and no one knew anything of its agriculture.

This is but a single example. Dozens of important medicines for human and animal healing are derived from plants. Have we found them all? Primitive man had no spectrometers, no X-rays, no chromatography, no radio-active tracers. Ready and waiting in the laboratories of modern man are all these tools and more. **Could not some agency, government or private, undertake research to examine all kinds of plants and find what they contain?**

If out of such research were found a new crop or crops to occupy fifteen or twenty per cent of the present American wheat acreage, or of the cotton acreage, our costly and extravagant dealings with those surpluses could be forgotten. One crop, old in Asia but new in America, has taken over so many acres that one can hardly imagine what the dimensions of the corn and oats so-called surpluses might now be, had the soybean not been introduced. One plant, wild in South America, was domesticated in Asia less than a century ago to enrich more nations than one, and to provide the rubber on which modern civilization moves. Yet less than a century ago I could not have sold you stock in a rubber monopoly for a dime a share.

Do you suppose nature has not hidden other equally valuable plants for human uses which we are unable to foresee or predict today? Why should we act like the confused Malthusian pessimists and ignore these rich green frontiers of the

yet unexplored vegetable kingdom?

I speak not only of discovering future uses for the non-edible portions of plants, but about edible possibilities, too. We feel the pressure of rising food needs in ever-growing populations. We shall need food plants in days to come that will grow on soils now regarded as infertile or unsuitable for the cultivation of foodstuffs.

Speaking as of the present moment, I would say that from the few crop species yet in cultivation, we have done fairly well finding values in the inedible portions. Corn cobs and oat hulls turn into furfural and that becomes nylon. Corn proteins, edible perhaps but more valuable otherwise, are being made into Vycara, a lovely fiber now sold in a thousand fabrics. Surplus vegetable oils and animal fats (at present soybean oil at the beginning rate of twenty million pounds a year) are oxidized into an amazing new plasticizing material. Paints and varnishes, adhesives and cosmetics, and hundreds of both ultimate and intermediate purposes are now met by utilizing the less edible or inedible portions of plants.

Each one of these uses makes more stable the food supply of mankind. The more a farmer can get for his corn cobs the more inducement he will have to grow corn.

The greater the repertoire of crops available to cultivation the more perfectly each crop will become attached to its most suitable soil. The wider the choice farmers may exercise among profitable crops to grow the fewer will be the problems of surplus and the greater will be agricultural income.

The larger income farmers can earn, the more precious will become the soil and the more important the waters will be. Richer farmers will take better care of their land because they will have more capital and more incentive to invest in its improvement.

It is high time to bring the green frontiers of the vegetable kingdom out of the Stone Age into the twentieth century and to find what rich countrysides they may disclose.



Geranium cuttings will root in ten days in moist sphagnum wrapped in polyethylene film.

NEW METHODS IN PLANT PROPAGATION

The modern propagator now has many new techniques which make productivity higher and his work easier

Lewis F. Lipp

Condensed from *Arnoldia*, September 25, 1953

THE majority of horticultural varieties of ornamental trees and shrubs must be grown by vegetative propagation for the reason that they do not develop true from seeds. However, they can be propagated by grafting or budding on seedling or clonal root stocks, by stem or root cuttings and by soil or air layering. All of these procedures have the flavor of great antiquity. Grafting of trees of merit on seedling root stocks was known in the Roman period, while air layering was performed by the Chinese thousands of years ago. Moreover, far back in time horticulturists used distinct methods of encouraging root formation of cuttings. They often placed a sprouting seed in a cleft

made at the base of the cutting thus providing the added hormone which stimulates root growth. Bottom heat for propagating beds was provided by filling a trench with fresh horse manure covered with soil. The decomposition of the manure provided the necessary heat. The Chinese kept their air layers moist by water dripping from an earthen vessel suspended above a split clay pot containing moss circling the branch.

Synthetic hormones, such as indole-acetic and indolebutyric acids, stimulate root formation in cuttings and air layers. Generally, hormones are applied to the cut surface of the cutting either in liquid or powdered form. They are made up in

arious strengths, for what is practical or one species may be impractical for nother.

Bottom heat in cutting frames is now provided by electric heating cables. High humidity needed for softwood cuttings was formerly provided by glass-enclosed cases and recently supplemented by automatic mist sprayers. Polyethylene film is now used to maintain high humidity in cutting beds and in aerial layering. These achievements do not substitute for the skill and judgment of the propagator, but they do make his task easier and there is an incalculable saving in labor.

The new polyethylene plastic film is one of the most useful materials in horticulture and enjoys immense popularity

today. This plastic film is the same as that used in the packaging of home frozen foods and some fruits and vegetables. We are using it for air layering, stratification of seeds, shipping and storing plant material and for the new propagating unit.

This new propagating unit developed by the writer has proved to be of great value to the amateur propagator and can be modified for professional needs. A deep greenhouse flat is filled with sand, vermiculite, or a mixture of sand, peat moss and "Styrofoam." For cuttings which root easily, sharp sand or vermiculite will do. For more difficult material a mixture is made up of seventy per cent peat, ten per cent sharp clean sand and twenty per cent "Styrofoam." The hard

Photo by Converse, courtesy Christian Science Monitor



The author and his propagating unit.

or soft wood cuttings are treated with a hormone powder and set in the flat. The cuttings then should be watered well. Next a wire frame is made over the flat for a framework to support a damp cheesecloth covering. Over the cheesecloth is placed a sheet of the semi-transparent polyethylene film large enough to tuck under the sides, ends and bottom of the flat. This plastic has the unexpected quality of checking loss of water and yet permits the cuttings to "breathe." The cheesecloth spreads the moisture evenly in the flat and adds a little shade for the cuttings.

When completed, the propagation unit can be placed on a greenhouse bench or in a window of a dwelling. During the late spring and summer the unit can be placed under a tree or in the shade of a building. The unit does not need to be watered for weeks or even months if well sealed; in fact, more than one watering may even be harmful! If placed in a greenhouse or sunny window it should be shaded by a newspaper during hot sunny days of summer.

After rooting. Once the cuttings are adequately rooted, care must be taken for they *must not be subjected* to extreme changes in atmosphere. Remove framework of wires and cheesecloth, then replace the plastic film over the cuttings and during excessively hot days place a newspaper shade over the film to prevent burning of cuttings. When the cuttings are well hardened, they can be planted in a coldframe, lath house or nursery. The use of "Styrofoam" gives the essential insurance of air in the rooting mixture over a long period. Cuttings may be left in the peat mixture to develop into rugged plants. A dilute nutrient solution should be added to this mixture for some species. Many propagators have had considerable experience with decay of softwood cuttings due to fungus growth. A good rule to safeguard cuttings is to add a small amount of "Fermate" to the rooting powder. With this principle and worthwhile precaution, a never-ending list of difficult plants has been rooted by the writer. Over

and above the scores of plants that have been rooted, apples, low birch (*Betula pumila*), purple smoketree (*Cotinus coggygria atropurpureus*), yellowberry English yew (*Taxus baccata fructu-luteo*), and Mongolian daphne (*Daphne altaica*) have also been grown from cuttings with this method.

Another method of using polyethylene film in the propagation of cuttings has been developed by Dale Sweet of Michigan State College. A handful of sphagnum or peat moss is placed on a small sheet or in a small bag of polyethylene film. The base of the cutting is placed in the moss and the plastic sheet pulled up around the cutting and closed with a rubber band. The plastic film was also used to cover flower pots to reduce water loss.

With a comparatively small expense this propagating method can be adapted for larger units. A greenhouse bench is lined with vermiculite or finely granulated peat moss about an inch deep. The plastic film is placed on this bed and filled with a peat-sand-"Styrofoam" mixture. The plastic film is left long enough at one side of the bench so that it can be drawn over a wooden frame to make a tight tent over the bench. This film can also be used to replace the glass covers in the conventional propagating frames.

One large nursery has used the polyethylene film to permit the propagation of cuttings in the field. The cutting beds which are about four feet wide are covered with a portable wire framework over which is spread a wide sheet of plastic film. The edges of the film are held down with strips of wood or brick to form a tightly closed tent over the cuttings. High humidity is maintained by an automatic mist sprayer. When shade is needed the propagating unit is covered with shade cloth. When the cuttings are well rooted the plastic tent is removed and the cuttings are left to grow in the field.

Softwood cuttings. Plastic propagating units are especially well adapted for

summer propagation from softwood cuttings. It is necessary to take the cuttings at the proper season and in the conventional way. The time factor and methods of taking the cuttings vary greatly with the different genera and often with the different species. For example, cuttings of roses are made in late June, July or August with the young twig cut off at the base of the current season's growth. Rhododendrons are propagated from July to November, using a clean cut at the base of the stem and making a heavy wound by cutting off some tissue immediately before treatment with hormone. Viburnums are cut from the middle of July on into September with the cut made below a node. Top quality rhododendrons, both in shape of plant and texture of flowers, have been successfully grafted onto freshly rooted cuttings all within a period of two months. Seventy-five per cent of these grafts have developed into sturdy plants with polyethylene solving this problem. Plastic bags are used for this grafting as well as for summer grafting in the field.

Seeds of apple (*Malus*), hawthorn (*Crataegus*), *Cotoneaster*, *Prunus*, oak (*Quercus*) and many maples (*Acer*) must be stratified. Many seeds have a pronounced dormancy that will require several weeks of high temperature before stratifying. At the Arboretum, we stratify by mixing the seed with damp peat moss in a plastic bag and storing in a refrigerator for several months. This semi-transparent bag permits one to see easily if any seeds are germinating, since some seedlings at this stage are somewhat susceptible to damping-off.

Plastics have provided a substitute for the conventional lath house. "Saran" cloth, now used for window screens, provides a good shade, reduces wind and can be used to exclude insects. Forest tree seedlings under a "Saran" cloth house needed no artificial watering while adjacent nursery plots have had to be watered several times during the summer. The

plastic is so light in weight that a light frame is sufficient.

Small trees and shrubs are now planted during the summer months by using balled and burlaped plants and preventing excessive transpiration by spraying the leaves with a special wax or latex emulsion.

The use of polyethylene film in air layering has been described by Dr. Wyman, in an earlier issue of "Arnoldia." Most nurserymen now use the plastic film in transporting scions, cuttings and bud wood. Some are using plastic bags to cover roots of nursery stock in transit. Plastic film is rapidly becoming one of the most useful materials in plant propagation.



The roots of balled and burlaped plants stay moist and in good condition even during hot weather, when the ball is wrapped in polyethylene film.

PROPAGATING BY CONSTANT MIST

Bathing cuttings in fine mist reduces disease and increases rooting

William G. Mitchell

Condensed from *Flower Grower*, July, 1953

YOU may be able to make that green thumb of yours even greener by rooting many of your cuttings under a new propagation system called constant mist. In this system, cuttings are simply bathed continuously in a fine mist of water—in full sunlight—for the entire rooting period. The mist is provided by special atomizing nozzles, which can be made or purchased, and it's a simple matter for the home gardener to set up the system and keep it operating. All that's needed is one or more flats or a propagation bench, one or more atomizing nozzles, a hose or pipe, and a continuous water supply at adequate pressure to operate the nozzle.

Advantages

This system, now under test at the Florida Agricultural Experiment Station, has several distinct advantages over the usual rooting methods. According to Dr. H. N. Miller and Austin Griffiths, Jr., of the Florida station, it affords almost 100 per cent freedom from the usual diseases of the propagating bench.

Other advantages: the humidity of the constant mist system maintains your cuttings in tip-top shape, with no wilting; and in the case of many plants, cuttings root faster and yield a higher percentage of well-rooted plantlets.

Outdoor Use

In warmer sections, constant mist can be used outdoors most of the year. In

more northerly areas, the system would have to be moved indoors under glass in winter. When the system is set up outdoors, some kind of wind protection is likely to be needed. However, Griffiths points out that wind protection doesn't seem critical when the proper nozzles are used and placed directly over the cuttings.

Rooting Medium

For most of the plants used in the tests, the rooting medium used did not make a significant difference. A mixture of equal parts vermiculite and peat, however, was about the best in most cases. Sawdust and sawdust-peat also proved good general-purpose rooting media. Satisfactory rooting, however, was obtained with all media.

Wide Variety of Plants Rooted

To give you an idea of the wide variety of plants that can be rooted under constant mist, here's a list of some of those which have given good results in Florida: azalea, boxwood, camellia, croton, common fig, gardenia, ivy, holly, common and California privet, myrtle, oleander, fire-thorn, roses, blackberry, raspberry, dewberry, blueberry and various haws. Most cuttings were standard, current-wood, stem propagations from average plants.

Azaleas, gardenias, hibiscus, privets and haws were some of the more readily rooting plants which responded most rapidly to the constant mist, while among the usually hard-to-root plants which reacted

vorably were holly, myrtle and roses. The good results obtained with azalea and *G* cuttings discount reports that hairy-aved materials can't be rooted under this stem.

Construction of System

Here's a description of one constant ist system set up by the Florida station ientists. The men laid four lengths of 1-inch galvanized pipe, connected by tree T's, down the middle of the propa-ating bench just above the rooting me-ium. They connected the pipe at one end to a hose, closing the other end with a cap. To the T's they then affixed three 14-inch-ong perpendicular pipe arms and con-ected an atomizing nozzle to the end of each arm. The nozzles used were simply standard faucets turned upside down. A

copper plate with a tiny hole in the center was then secured to each faucet by a screw ring and a small baffle-plate fixed directly overhead. Water from the tiny hole hit the baffle-plate, produc-ing a heavy mist of water. Baffle-plate nozzles such as this can be made at home or purchased for less than \$2.

A modified baffle nozzle has a regulating screw with a blunt point that may be run down toward the tiny hole to produce a mist. This and the other commercially produced baffle types are all non-clogging and so will pay for themselves in convenience and water saved—they use only about a gallon of water per hour, while homemade baffle types may use considerably more. Another type of nozzle pro-duces mist in an internal mixing chamber.

WITHIN THE BROOKLYN BOTANIC GARDEN

OUR USE OF MIST IN PLANT PROPAGATION

AT the Brooklyn Botanic Garden fog propagation promises to be a new and valuable addition to horticultural practice. While much remains to be learned, some information is now available which we believe will prove of interest to the readers of PLANTS & GARDENS.

Some of the obvious advantages of the method are:

1. Cuttings may be taken as large as desired.
2. Leaves may be left on the plant material without fear of permitting over-vaporation.
3. Shading is no longer necessary except with shade-loving plants.
4. Unlimited fresh air and oxygen are available without danger of drying by drafts or from low humidity sometimes.

prevailing in the atmosphere.

5. Cuttings may be taken and inserted at any time of day and during the hottest and driest weather.

Following are a few of the more difficult plants with which remarkable re-sults have been obtained, using the mist method of propagation:

Temperate-climate plants

(Cuttings taken from green wood any time between May and September)

- Apple (*Malus*)
- Dogwood (*Cornus*)
- Flowering cherry (*Prunus*)
- Holly (*Ilex*)
- Japanese apricot (*Prunus*)
- Lilac (*Syringa*)
- Maple (*Acer*)
- Rose (*Rosa*)



Fog box used at the Brooklyn Botanic Garden for propagation by constant mist.

Warm-climate or greenhouse plants
(Cuttings taken at any time from non-dormant wood)

- Camphor (*Cinnamomum*)
- Chocolate (*Theobroma*)
- Jasmine (*Jasminum*)
- Laurel (*Laurus*)
- Lemon (*Citrus*)
- Pepper (*Piper*)
- Surinam-cherry (*Eugenia*)
- Sugar-apple (*Annona*)

It has been observed here, time and again,

and corroborated at other places where experiments with mist are being conducted, that contrary to what might reasonably be expected under such wet conditions, mist acts as an inhibitor in the spread of fungus diseases. More remains to be learned about this phase of the work but even with the information which we now have, it seems that the relative freedom from loss of cutting through fungus attack will be a strong argument in favor of mist propagation.

L. W.



Stachyurus (S. chinensis), a difficult subject, rooted in constant mist.

Adjustable nozzle for producing mist.





NORTH READING

SELECTED LIST OF RECENT
NONTECHNICAL BOOKS, MAGAZINE ARTICLES,
AND EXPERIMENT STATION BULLETINS

General

WATER, MIRACLE OF NATURE, by Thomson King. Published by Macmillan, New York, 1953. 238 pages, \$3.50.

The story of the role of water in the physical world and in the world of living things. Discusses all aspects of water from its physical and chemical properties to dowsing and dew-ponds.

MICROBES AT WORK, by Millicent E. Elsam. Published by Morrow, New York, 1953. 95 pages, \$2.00.

A book for children, telling of the important role played by microorganisms in daily life. Easy-to-do experiments are described.

THE SECRET OF THE GREEN THUMB, by Henry T. Northen and Rebecca T. Northen. Published by Ronald Press, New York, March, 1954. 453 pages, \$5.00.

Plant science for the layman. Presents the fundamentals of botany and their practical application to gardening in a thorough but easy-to-read manner. Well illustrated.

DOWNS AND DUNES, THEIR PLANT LIFE AND ITS ENVIRONMENT, by Edward J. Salisbury. Published by British Book Centre, New York, 1952. 328 pages, \$10.00.

Descriptions and biology of the plants growing on the English chalk downs and sand dunes. Detailed descriptions of the down and dune habitats. Chapters on animal life included.

CENTRAL PARK — BLUE PRINT FOR SOIL EROSION, by Rosalie Edge. In *National Parks Magazine*, January-March, 1953. 6 pages.

The problem of soil and plant conservation as it is presented in New York's famous Central Park. Illustrated.

CARL LINNAEUS, by Knut Hagberg. Published by Dutton, New York, 1953. 264 pages, \$4.50.

The fascinating personality, ideas and inward development of the great Swedish botanist.

CHARLEY MOON, by Reginald Arkell. Published by Harcourt, Brace, New York, 1953. 155 pages, \$2.50.

A novel reaffirming one of the values which made so many friends for the author's "Old Herbaceous"—that the life of the soil is a good one.

DIRECTORY OF AMERICAN HORTICULTURE FOR 1954. Published by the American Horticultural Council, Ithaca, N. Y., 1953. 96 pages, \$1.00.

Alphabetical listing of horticultural organizations of the U. S. and Canada, with names and addresses of secretaries, dues, membership, publications and other pertinent information. Includes botanic gardens, arboreta, test gardens, as well as horticultural awards, All-America selections.

GUIDE TO ENGLISH GARDENS, by Alice Chauncey. Published by Horticultural Society of New York, New York, 1953. 28 pages, \$1.00.

Useful guide for visitors to England, listing private and public gardens which can be seen. Brief description of each and directions telling how to reach them.

THE ARBORETUMS AND BOTANICAL GARDENS OF NORTH AMERICA, by Donald Wyman. (Reprinted from "Chronica Botanica"). Published by the American Association of Botanical Gardens and Arborets. Available from C. W. Fenninger, 1632 Chestnut St., Philadelphia 3, Pa. 103 pages, \$1.50.

Contains descriptions of all active arborets and botanical gardens in North America. Illustrated.

SONGBIRDS IN YOUR GARDEN, by John K. Terres. Published by Crowell,

New York, 1953. 274 pages, \$3.95.

Contains a wealth of information about birds and how to attract them to the garden. Many interesting anecdotes about birds.

BIRDS AS INDIVIDUALS, by Len Howard. Published by Doubleday, Garden City, N. Y., 1953. 219 pages, \$4.00.

The experiences of an English bird lover who literally lives with birds. Scientifically valid as well as unusual in its approach. Two parts: Bird Behavior and Bird Song.



Horticultural Practices and Gardening



PRUNING NARROWLEAF EVERGREENS, by H. R. Kemmerer. University of Illinois (Urbana, Ill.) College of Agriculture Extension Service Circular 708, April, 1953. 8 pages.

How and when to prune evergreens. Numerous illustrations.

GRAFTING FRUIT TREES, by T. S. Weir. University of Minnesota (St. Paul, Minn.) Institute of Agriculture Extension Bulletin 273, April, 1953. 15 pages.

Clearly illustrated instructions for making various kinds of grafts.

FOLIAR NUTRITION SPRAYS ON VEGETABLE CROPS, by E. P. Brasner, J. R. Wheatley, and W. L. Ogle. University of Delaware Agricultural Experiment Station (Newark, Del.) Bulletin 295, April,

1953. 18 pages.

Controlled studies of the effects of nutrient leaf sprays on several common crop vegetables.

CHEMOTHERAPY OF PLANTS, by Nestor E. Caroselli. In *Trees Magazine*, July-August, 1953. 3 pages.

Discussion of the history and practical value of treating plant diseases by introducing chemicals into the plant body.

PREPVENT VEGETABLE DISEASES, by O. D. Burke and R. S. Kirby. Pennsylvania State College (State College, Pa.) Agricultural Extension Service Circular 417, May, 1953. 30 pages.

Methods to use with seed and in the garden; symptoms of disease; chemicals to use.

Landscaping and Lawns

HOW TO PLANT YOUR HOME GROUND, by Henry B. Aul. Published by Sheridan House, New York, 1953. 383 pages, \$3.50.

Complete, easy-to-follow information on what to plant, how and where to plant near the house, in the garden, and on home grounds. Well illustrated.

LAWN MANAGEMENT, by A. E. Cooper. Pennsylvania State College (State College, Pa.) Agricultural Extension Service Bulle-

tin 412, February, 1953. 14 pages.

Instructions for mowing, raking, rolling, renovating old lawns, preparing soil, controlling weeds.

INSTALLING A SPRINKLER SYSTEM: NEW NON-METAL PIPE MAKES THE WHOLE JOB A LOT EASIER. In *Sunset*, October, 1953. 4 pages.

How to plan and install a lawn sprinkler system using new rubber and plastic pipes.



Garden Flowers and Vegetables



ONCISE ENCYCLOPEDIA OF FAVORITE FLOWERS, by Marjorie P. Johnson and Montague Free. Published by Doubleday, Garden City, N. Y., 1953. 256 pages, \$3.95.

Convenient reference book covering 106owering plants, alphabetically arranged. gives the common and scientific names of each, uses, culture, faults and assets.

COMPLETE BOOK OF BULBS, by F. F. Rockwell and E. C. Grayson. Published by Doubleday, Garden City, N. Y., 1953. 352 pages, \$5.95.

A practical manual on the uses, cultivation and propagation of more than 100 species of bulbous plants. Profusely illustrated with photographs and drawings.

THE GARDEN OF BELLFLOWERS, by Liberty Hyde Bailey. Published by Macmillan, New York, 1953. 155 pages, \$5.00.

A definitive book dealing with a neglected group of garden flowers. It explains the culture of bellflowers and identifies and describes every bellflower available for garden use in the United States.

PLANTS OF COLONIAL DAYS, by Raymond L. Taylor. Published by Colonial Williamsburg, Inc., Williamsburg, Va., 1952. 107 pages, \$1.00.

Brief descriptions of flowers, shrubs and trees growing in the gardens of Colonial Williamsburg. Also contains brief biographical sketches of several early collectors, botanists and gardeners.

100 PLANTS OF SOUTH FLORIDA, by Julia F. Morton and R. Bruce Ledin. Published by Text House, Coral Gables, Fla., 1953. 134 pages, \$3.50.

Brief descriptions of over 400 native and exotic plants which are found in south Florida (and many in central and north Florida). 28 full-page drawings.

FLOWERS OF THE SOUTH, by Wilhelmina F. Greene and Hugo L. Blomquist. Published by University of North Carolina Press, Chapel Hill, N. C., 1953. 208 pages, \$5.00.

Descriptions of over 300 flowers found from Virginia to Texas and south. Profusely illustrated in black and white and in color. Two sections: native plants and exotic plants.

PEONY CULTURE, by R. E. Lee. Bulletin 893.

THE CULTURE OF GARDEN CHRYSANTHEMUMS, by R. E. Lee. Bulletin 894.

THE CULTURE OF IRIS, by L. H. Mac Donald. Bulletin 895.

THE CULTURE OF SPRING FLOWERING BULBS, by R. E. Lee. Bulletin 896.

THE CULTURE OF GARDEN ROSES, by R. E. Lee. Bulletin 897.

New York State College of Agriculture at Cornell University (Ithaca, N. Y.), June, 1953. Each bulletin 4 pages.

Specifie information on the culture of each of these popular garden flowers.

TEN BEST FERNS FOR NORTHEASTERN GARDENS, by R. C. Benedict. In *American Fern Journal*, January-March, 1953. 6 pages.

List, with nontechnical descriptions, of ten fern species suitable for gardens east of the Mississippi and north of the Mason-Dixon Line. Five "runners-up" are also listed.

CACTI AND SUCCULENTS, by Gilbert C. Greene. Published by Pitman, New York, 1953. 238 pages, \$7.00.

Cultivation, classification and identification of succulents. Includes a dictionary of cacti and of succulents other than cacti.

THE YEARS IN MY HERB GARDEN, by Helen M. Fox. Published by Macmillan, New York, 1953. 185 pages, \$3.50.

Full descriptions of many common and uncommon herbs, their natural habitats and histories. Discusses their place in the garden and adaptability to climate, light and soil.

HERBS IN THE GARDEN, by Norman Taylor. Published by Van Nostrand, New York, 1953. 99 pages, \$2.00.

The science of growing herbs and the art of using them.

FRAGRANCE IN THE GARDEN, by Norman Taylor. Published by Van Nostrand, New York, 1953. 110 pages, \$2.00.

A key to the use of plant material to secure many fragrances in the garden, in cut flowers and in sachets.



Indoor Gardening and Flower Arrangement



HOW TO GROW BEAUTIFUL HOUSE PLANTS, by T. H. Everett. Published by Arco, New York, 1953. 144 pages, \$2.00.

A complete guide to the raising of house plants. Over 400 photographs.

HOUSE PLANTS APPRECIATE CONSTANT-LEVEL WATERING, by Montague Free. In *The Home Garden*, February, 1953. 4 pages.

A method of watering which provides more uniform soil moisture than can be obtained by usual surface watering.

AFRICAN VIOLET VARIETY LIST, by Carolyn K. Rector. Published by Lane Publishing Co., Menlo Park, California, 1953. 76 pages, 50c.

Contains over 2,000 detailed listings of up-to-date information, including correct name, description, relation to other varieties. Includes names of hybridizers where known.

PHILIPPINE ORCHIDS, by Reginald S. Davis and Mona Lisa Steiner. Published by William-Frederick Press, New York, 1952. 270 pages, \$5.00.

A detailed, semi-popular treatment of native Philippine orchids, many of which are in general cultivation. Chapters on history, climate and geography of the Philippines are included.

CHRISTMAS IDEA BOOK, by Dorothy Biddle and Dorothea Blom. Published by Barrows, New York, 1953. 221 pages \$3.50.

Covers every phase of Christmas decorating from gift-wrapping to outdoor tree lighting.

JAPANESE FLOWER ARRANGEMENT IN A NUTSHELL, 2nd ed., by Ellen Gordon Allen. Distributed by the Green Thumb Augusta, Ga., 1952. 52 pages, \$2.00.

A primer of the Japanese art of flower arranging. Well illustrated.

STYLING CORSAGES WITH GARDEN FLOWERS, by Mary H. Drummond. Published by Macmillan, New York, 1953. 247 pages, \$4.75.

Clear, step-by-step directions for making corsages. How to use over a hundred suitable flowers, including many that are found in nearly every garden.



Pests and Diseases



PLANT DISEASES. Yearbook of Agriculture. U. S. Department of Agriculture, 1953. For sale by the Superintendent of Documents, Washington 25, D. C. 940 pages, \$2.50.

Authoritative discussions by numerous authors of all phases of plant disease. Thirty-two excellent color plates illustrate symptoms of various diseases.

GARDEN ENEMIES, by Cynthia Westcott. Published by Van Nostrand, New York, 1953. 261 pages, \$3.50.

Descriptions and illustrations of diseases, insects and other plant pests. Includes charts for recognizing pests by their patterns and a dictionary of modern pesticides.

INSECT, FUNGUS AND WEED CONTROL, by E. R. de Ong. Published by Chemical Publishing Co., New York, 1953. 400 pages, \$10.00.

Detailed guide to modern methods of control. Information is grouped according to the field of application. Chapters on herbicides, seed disinfectants, forest insects and diseases, household pests.

SEED AND SOIL TREATMENTS FOR PREVENTION OF DISEASES IN VEGETABLES AND FLOWERS, by R. D. Watson, University of Idaho Agricultural Experiment Station (Moscow, Idaho) Circular 127, June, 1953. 15 pages.

How to sterilize soil, how to run germination tests, how to sterilize vegetable and flower seeds and bulbs.

Trees and Shrubs

PCKET GUIDE TO THE TREES, by Rutherford Platt. Published by Poeket books, New York, 1953. 256 pages, 35¢. A reissue in popular pocket book form the author's "American Trees."

REES AND THEIR STORY, by Dorothy Erling and Myron Ehrenberg. Published Doubleday, Garden City, N. Y., 1953. 9 pages, \$2.50.

Readable discussion of trees and their growth, simply told. Many excellent photographs.

REET TREES FOR CONNECTICUT, by H. O. Perkins. Agricultural Extension Service, University of Connecticut (Storrs, Conn.) Folder 68, April, 1953. 6 pages.

Simple instructions for choosing, planting, and caring for street trees. Gives lists of desirable kinds.

OLLIES, by Harold H. Hume. Published by Macmillan, New York, 1953. 242 pages, \$7.50.

The first book devoted to holly. Deals with the important species and varieties of holly. Methods of raising, propagation, landscape uses, diseases are discussed. Includes chapters on history of holly and its beverage hollies.

ZALEAS AND CAMELLIAS, by H. H. Hume. Published by Macmillan, New York, 1953. 93 pages, \$2.50.

Revised edition of Dr. Hume's earlier book, this contains completely new list of camellia varieties and up-to-date information on diseases and pest control.

THE PAGEANT OF THE ROSE, by Jean Gordon. Published by Studio Publications, and Thomas Y. Crowell, New York, 1953. 232 pages, \$5.00.

The part played by the rose in myth, legend, art and history. Numerous photographs and drawings.

TIPS FOR BETTER LANDSCAPES — ATTRACTIVE BARKS, by Clarence E. Lewis. In *American Nurseryman*, June 15, 1953. 4 pages.

Discussion of a neglected ornamental feature of many woody plants—the bark. Lists plants whose bark makes them useful in landscape planting.

HOLLY CHECK LIST. Published by the Holly Society of America, 1953. Available from Charles A. Young, Jr., Bergner Mansion, Gwynn Falls Park, Baltimore 16, Md. 56 pages, \$1.00.

Contains the names of over 600 kinds of hollies grown in this country, with complete classification, names of introducers, public gardens where grown, and nurseries from which they are available.

1953 LILAC SURVEY. Published for the American Association of Botanical Gardens and Arboreta. Available from Scott Horticultural Foundation, Swarthmore College, Swarthmore, Pa. 48 pages, \$1.00.

Contains the names of some 950 lilacs. Gives proper classification, names of breeders or introducers, public gardens where grown, nurseries from which they are available, and a list of 100 recommended varieties.



Native Flowers



Descriptions of hundreds of native American flowers. 232 colored plates.

WILD FLOWERS OF AMERICA, by H. W. Rickett. Paintings by Mary Vaux Walcott and Dorothy Falcon Platt. Published by Crown Publishers, New York, 1953. 400 plates, \$10.00.

Based on the portfolio set "North American Wild Flowers" by Mrs. Walcott, published by the Smithsonian Institution. This volume contains additional paintings by Dorothy F. Platt and detailed descriptions by H. W. Rickett.

LANTS OF ROCKY MOUNTAIN NATIONAL PARK, rev. ed., by Ruth Ashton Elson. U. S. Dept. of Interior, 1953. For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 31 pages, \$1.00.

Detailed descriptions and keys to plants of the Rocky Mountains. Fully illustrated.

HE MACMILLAN WILD FLOWER BOOK, by Clarence J. Hylander. Published by Macmillan, New York, February, 1954. 480 pages, \$15.00.

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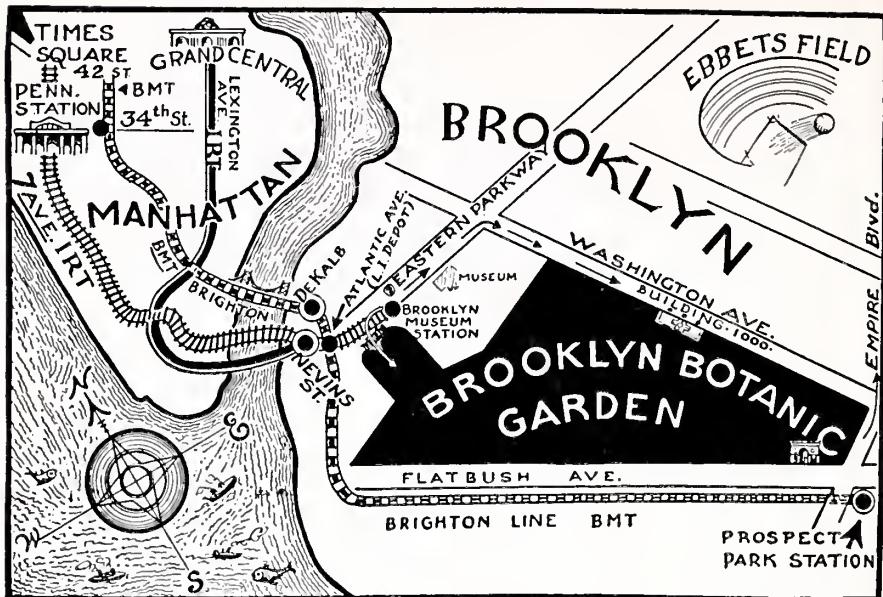
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TO REACH THE GARDEN

By Subway

B.M.T. (Brighton Beach line) downtown express or local to Prospect Park Station.

I.R.T., West Side (7th Avenue or Broadway-7th Avenue line) downtown express marked "New Lots Avenue" or "Flatbush Avenue," to Eastern Parkway-Brooklyn Museum Station.

I.R.T., East Side (Lexington Avenue line) downtown express marked "New Lots Avenue" or "Utica Avenue" or "Atlantic Avenue," to Nevins Street; step across platform and change to 7th Avenue or Broadway-7th Avenue train, ride to Eastern Parkway-Brooklyn Museum Station.

By Bus

Flatbush Avenue bus to Empire Boulevard
 Lorimer Street bus }
 Tompkins Avenue bus } To Flatbush Avenue

Union Street bus }
 Vanderbilt Avenue bus } To Prospect Park Plaza

By Automobile

From Long Island, take Eastern Parkway westward, and turn left at Washington Avenue.

From Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway; follow the Parkway to Washington Avenue, then turn right.

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